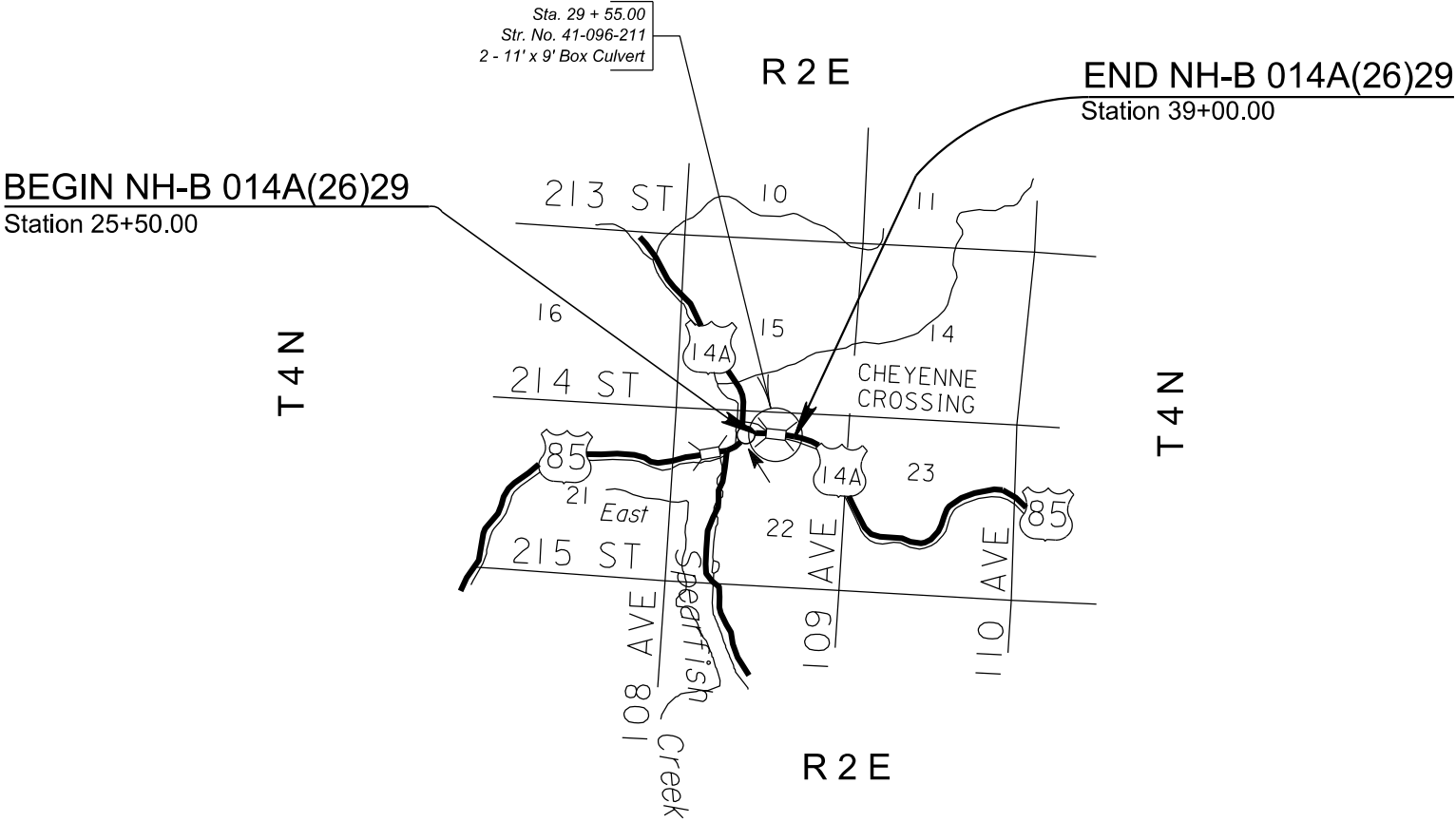
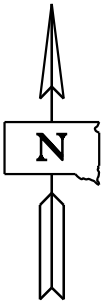


STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E1	E21

Section E: Structure Plans

INDEX OF SHEETS -

Sheet E1	Layout Map and Index
Sheet E2	Estimate of Structure Quantities
Sheet E3 to E21	Str.No. 41-096-211 2 - 11' x 9' Box Culvert



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E2	E21

SECTION E – ESTIMATE OF STRUCTURE QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0010	Structural Steel	122	Lb
420E0200	Structure Excavation, Box Culvert	221	CuYd
421E0200	Box Culvert Undercut	686	CuYd
460E0120	Class A45 Concrete, Box Culvert	639.4	CuYd
460E0380	Install Dowel in Concrete	146	Each
480E0100	Reinforcing Steel	116,426	Lb
700E0210	Class B Riprap	825.5	Ton
734E1200	Natural Streambed Material	199.4	Ton
734E1201	Natural Streambed Material Type 1	673.9	Ton
831E0110	Type B Drainage Fabric	831	SqYd

INCIDENTAL WORK, STRUCTURE

1. Incidental Work, Structure will consist of the removal of the following structure:

Str. No. 41-096-211 In-place centerline Sta. 28+43 is a twin 10' x 4' box culvert skewed 45° RHF with 30° & 15° Flared Wing Walls.
2. Break down and remove the existing structure 1 foot below finished ground or as required to construct the new structure in accordance with Section 110 of the Specifications. All portions of the existing structure will be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with Notes found in SECTION A.
3. During demolition of structure, efforts will be taken to prevent material from falling into the creek. Under no circumstances is asphalt allowed to fall into the creek.
4. The foregoing is a general description of the in-place structure and should not be construed to be complete in all details. Before preparing the bid it shall be the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of the work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the Office of Bridge Design.

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E3	E21

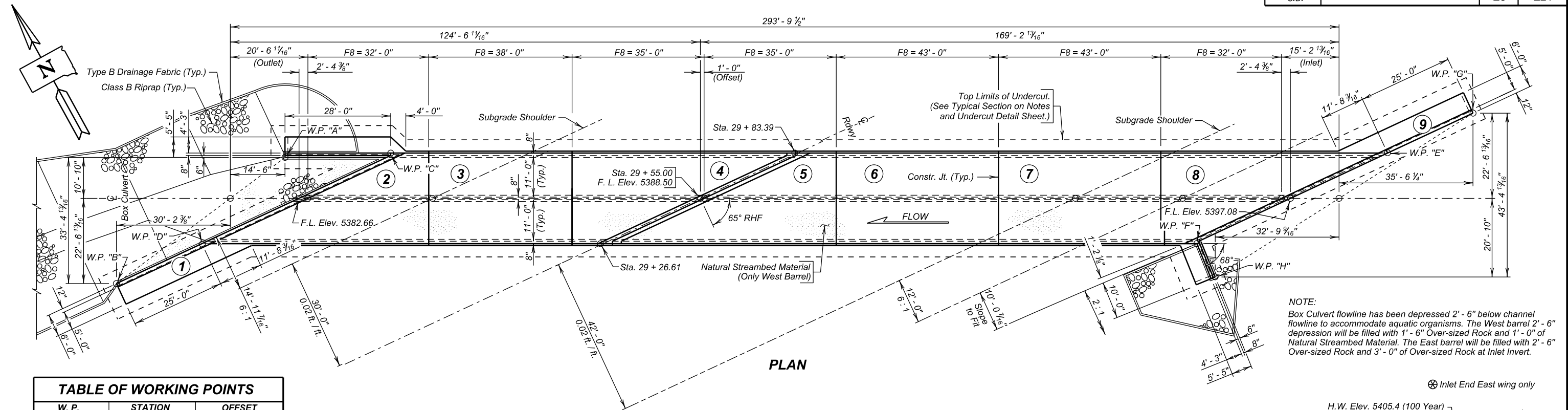
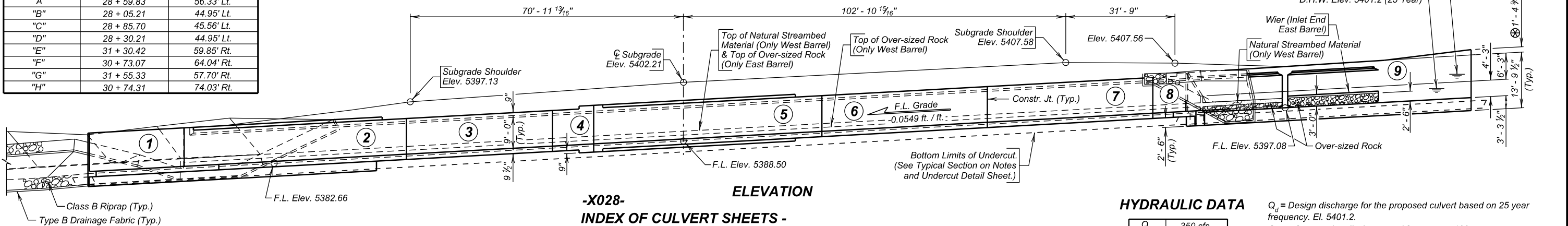


TABLE OF WORKING POINTS		
W. P.	STATION	OFFSET
"A"	28 + 59.83	56.33' Lt.
"B"	28 + 05.21	44.95' Lt.
"C"	28 + 85.70	45.56' Lt.
"D"	28 + 30.21	44.95' Lt.
"E"	31 + 30.42	59.85' Rt.
"F"	30 + 73.07	64.04' Rt.
"G"	31 + 55.33	57.70' Rt.
"H"	30 + 74.31	74.03' Rt.



-X028- INDEX OF CULVERT SHEETS -

- Sheet No. 1 - General Drawing and Quantities
- Sheet No. 2 - Notes and Undercut Details
- Sheet No. 3 - Phased Construction Details
- Sheet No. 4 - Subsurface Investigation
- Sheet No. 5 - Inlet Details (A)
- Sheet No. 6 - Inlet Details (B)
- Sheet No. 7 - Outlet Details (A)
- Sheet No. 8 - Outlet Details (B)
- Sheet No. 9 - F8 Barrel End Section Details (32' - 0") (A)
- Sheet No. 10 - F8 Barrel End Section Details (32' - 0") (B)

INDEX OF CULVERT SHEETS CONT. -

- Sheet No. 11 - F8 Barrel End Section Details (32' - 0") (C)
- Sheet No. 12 - F8 Barrel Interior Section Details (35' - 0") (A)
- Sheet No. 13 - F8 Barrel Interior Section Details (35' - 0") (B)
- Sheet No. 14 - F8 Barrel Interior Section Details (35' - 0") (C)
- Sheet No. 15 - F8 Barrel Interior Section Details (38' - 0")
- Sheet No. 16 - F8 Barrel Interior Section Details (43' - 0")
- Sheet No. 17 - Riprap Details
- Sheet No. 18 - Standard Plate No.'s 460.02 and 460.10
- Sheet No. 19 - Standard Plate No. 620.16

HYDRAULIC DATA

Q_d	350 cfs
A_d	36 sq ft
V_d	9.7 fps
Q_F	350 cfs
Q_{100}	959 cfs
Q_{OT}	$> Q_{100}$
V_{max}	15.3 fps

Q_d = Design discharge for the proposed culvert based on 25 year frequency. El. 5401.2.
 Q_{OT} = Overtopping discharge and frequency >100 year recurrence interval. El. 5411.0 @ Sta. 30 + 50.
 Q_F = Designated peak discharge for the basin approaching proposed project based on 25 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 5405.4.
 V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

GENERAL DRAWING AND QUANTITIES

FOR 2 - 11' X 9' BOX CULVERT

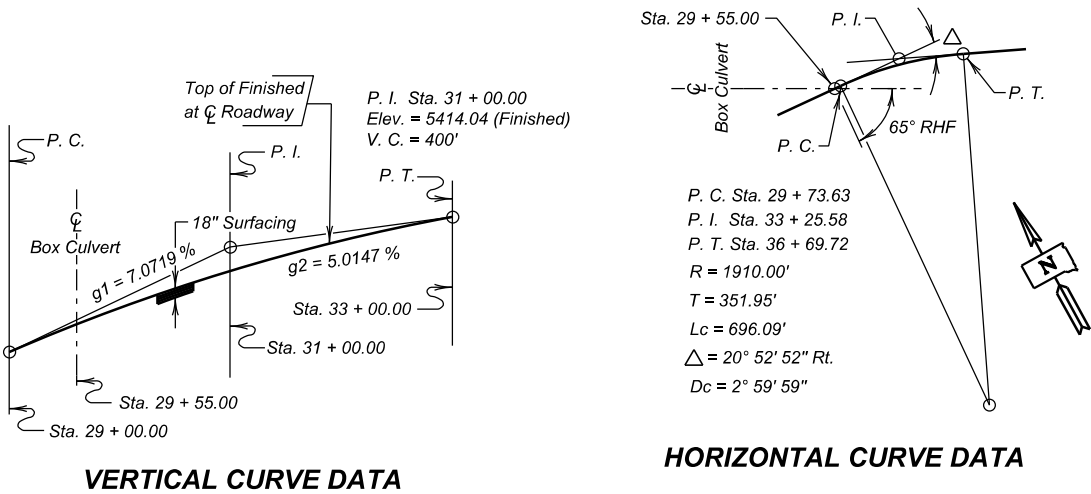
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
PCN 06XL

65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

-X028-

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLT01	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	-------------------------------	------------------	-------------------------------------



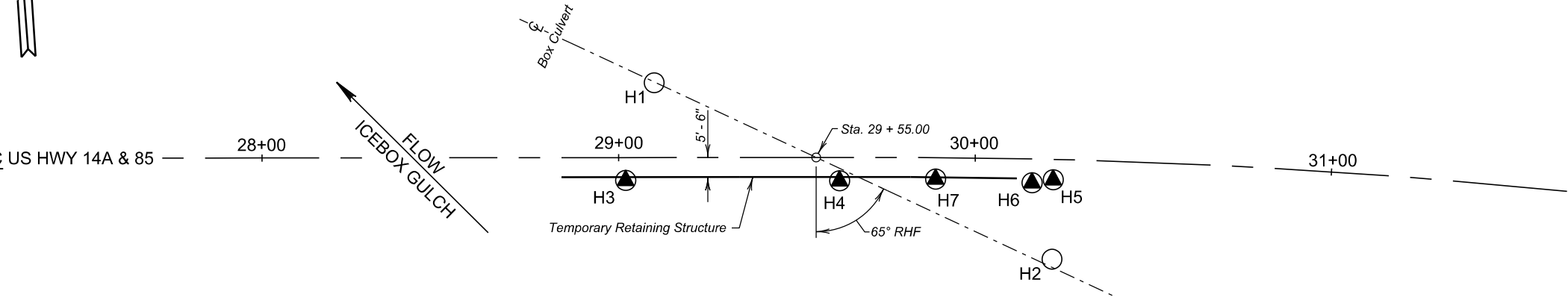
VERTICAL CURVE DATA

HORIZONTAL CURVE DATA

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Box Culvert	Cu. Yd.	639.4
Reinforcing Steel	Lb.	116426
Structure Excavation, Box Culvert	Cu. Yd.	221
Box Culvert Undercut	Cu. Yd.	686
Type B Drainage Fabric	Sq. Yd.	831
* Class B Riprap	Ton	825.5
* Natural Streambed Material	Ton	199.4
* Natural Streambed Material 1	Ton	673.9
Structural Steel	Lb.	122
Install Dowel in Concrete	Each	146

* For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yds. to Tons.

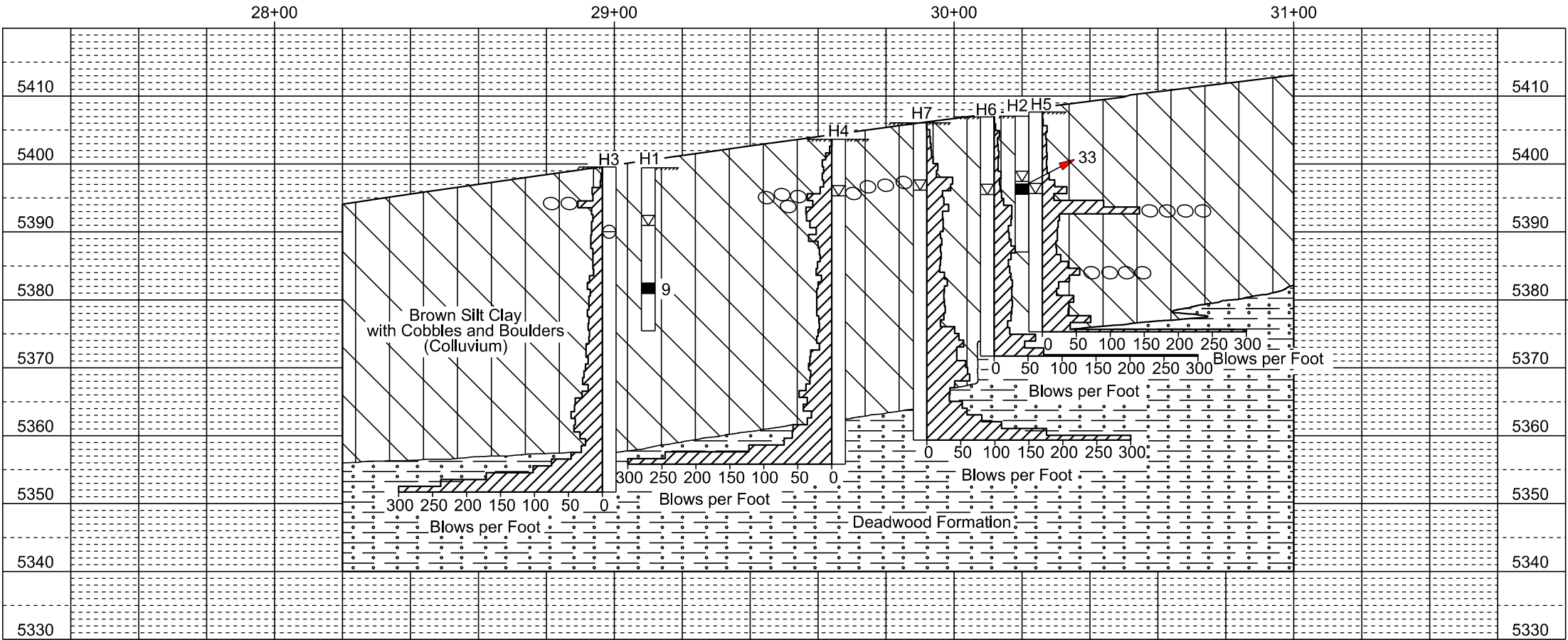
PLANS BY:
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION



PLAN

SOIL PARAMETERS FOR TEMPORARY RETAINING STRUCTURE

	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γ_w)
Brown Silt Clay with Cobbles & Boulders (Colluvium)	18°	150 psf	120 pcf



The Deadwood Formation consists of thick sequences of tan sandstone, conglomerate, shale, and limestone.

The Geotechnical Engineering Activity has all of the boring logs and laboratory test results available for review at the Central Office in Pierre.

LEGEND

- Penetration Test
- ▽ Water
- ◐ Sample Zone
- Drive Test
- ⊖ Caved

Drive tests are conducted by dropping a 490 pound hammer 30 inches to drive a 2 7/8 inch drill stem to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6 5/8 inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot.

GROUNDWATER ELEVATIONS

OCTOBER 2023

H1	5391.0
H2	5397.5

MAY 2025

H3	(Caved)	5390.1
H4		5395.3
H5		5395.7
H6		5392.0
H7		5391.7

MEASURED SKIN FRICTION

	ELEV.	PSF
H3	5351.7	427
H4	5355.8	844
H5	5375.3	278
H6	5368.2	980
H7	5354.9	1260

SUBSURFACE INVESTIGATION

FOR

2 - 11' X 9' BOX CULVERT

OVER ICEBOX GULCH

STA. 29 + 55.00

STR. NO. 41-096-211

65° RHF SKEW

SEC. 22-T4N-R2E

NH-B 014A(26)29

HL-93

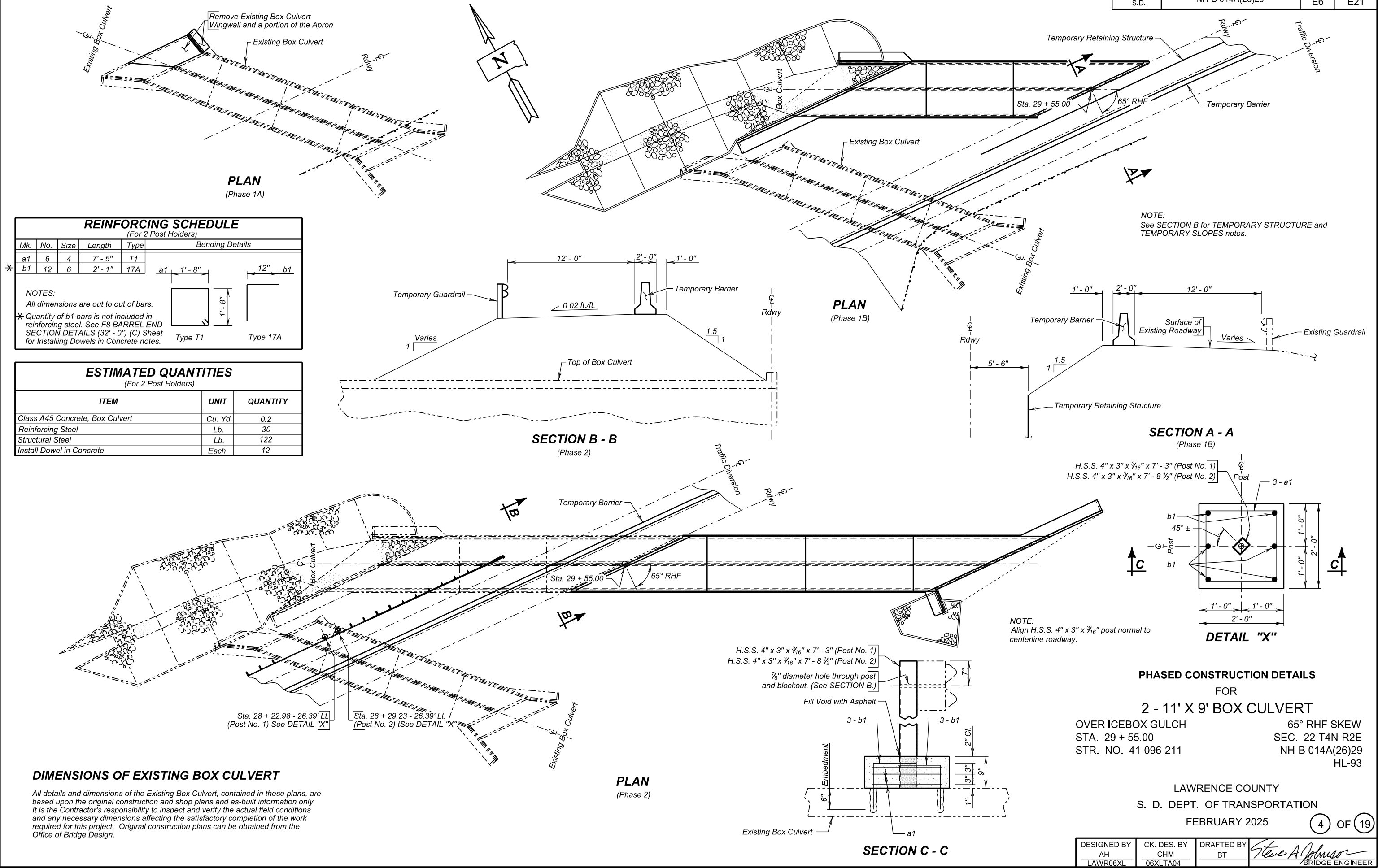
LAWRENCE COUNTY

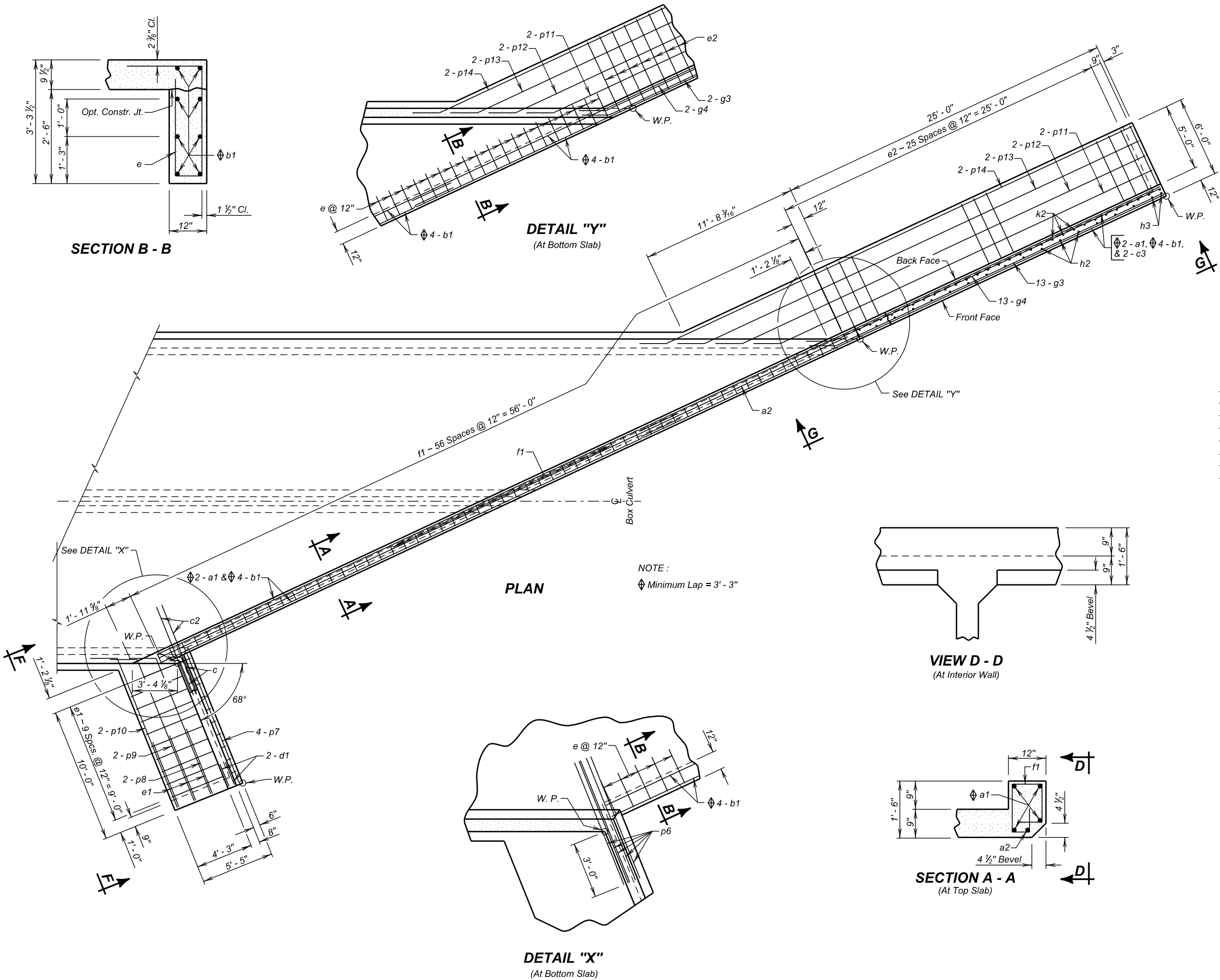
S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2025

3 OF 19

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLT A03	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	---------------------------------	------------------	-------------------------------------





REINFORCING SCHEDULE				
Mk.	No.	Size	Length	Type
a1	8	6	42'-6"	Str.
a2	1	6	56'-3"	Str.
b1	16	6	42'-3"	Str.
c	2	5	4'-6"	1A
c1	4	5	11'-9"	Str.
c2	2	5	7'-0"	19B
c3	4	5	30'-6"	19B
d1	4	5	8'-6"	19B
e	54	4	8'-3"	S12
e1	13	4	11'-6"	S12A
e2	27	5	12'-9"	S12
f1	57	4	5'-0"	S6A
g0	6	5	5'-0"	19B
g1	7	4	16'-0"	19B
g2	6	4	11'-9"	19B
g3	13	4	28'-6"	19B
g4	13	4	29'-0"	19B
h0	3	4	26'-6"	17A
h1	1	4	10'-0"	17A
h2	8	4	35'-9"	17A
h3	2	4	19'-3"	17A
k0	5	4	19'-0"	17A
k1	1	4	6'-6"	17A
k2	14	4	29'-6"	Str.
k3	1	4	16'-0"	Str.
p6	5	6	7'-0"	Str.
p7	9	4	12'-6"	Str.
p8	2	4	12'-9"	Str.
p9	2	4	13'-0"	Str.
p10	2	4	13'-6"	Str.
p11	2	4	32'-0"	Str.
p12	2	4	34'-6"	Str.
p13	2	4	37'-0"	Str.
p14	2	4	39'-6"	Str.

Bending Details

Type S12A: e1 4'-8 1/2", e2 5'-9", e 2'-0"

Type S12: e2 3'-5", e 2'-10 1/2", e 8 1/2"

Type 19B: g1 9'-7", g2 2'-5", g3 2'-5", g4 9'-7", h0 6'-0 1/2", h1 10'-11 1/2", h2 11'-0", h3 13'-3", k0 6'-3", k1 10'-11", k2 4'-8", k3 5'-9", k4 1'-0"

Type 17A: g4 27'-0", g3 26'-6", g2 9'-9", g0 2'-6", d1 6'-9", d2 5'-0", c2 25'-0", c3 12 1 5/16", c2 17 1/2", k2 13'-6", k3 16'-0", k4 14'-8", k5 14'-10"

Type 19B: f1 9 1/2", f2 8", f3 12 3/4", f4 4'-8", f5 5'-9", f6 1'-0", f7 7 1/2", f8 3'-11", f9 3"

Type 1A: c 3'-11"

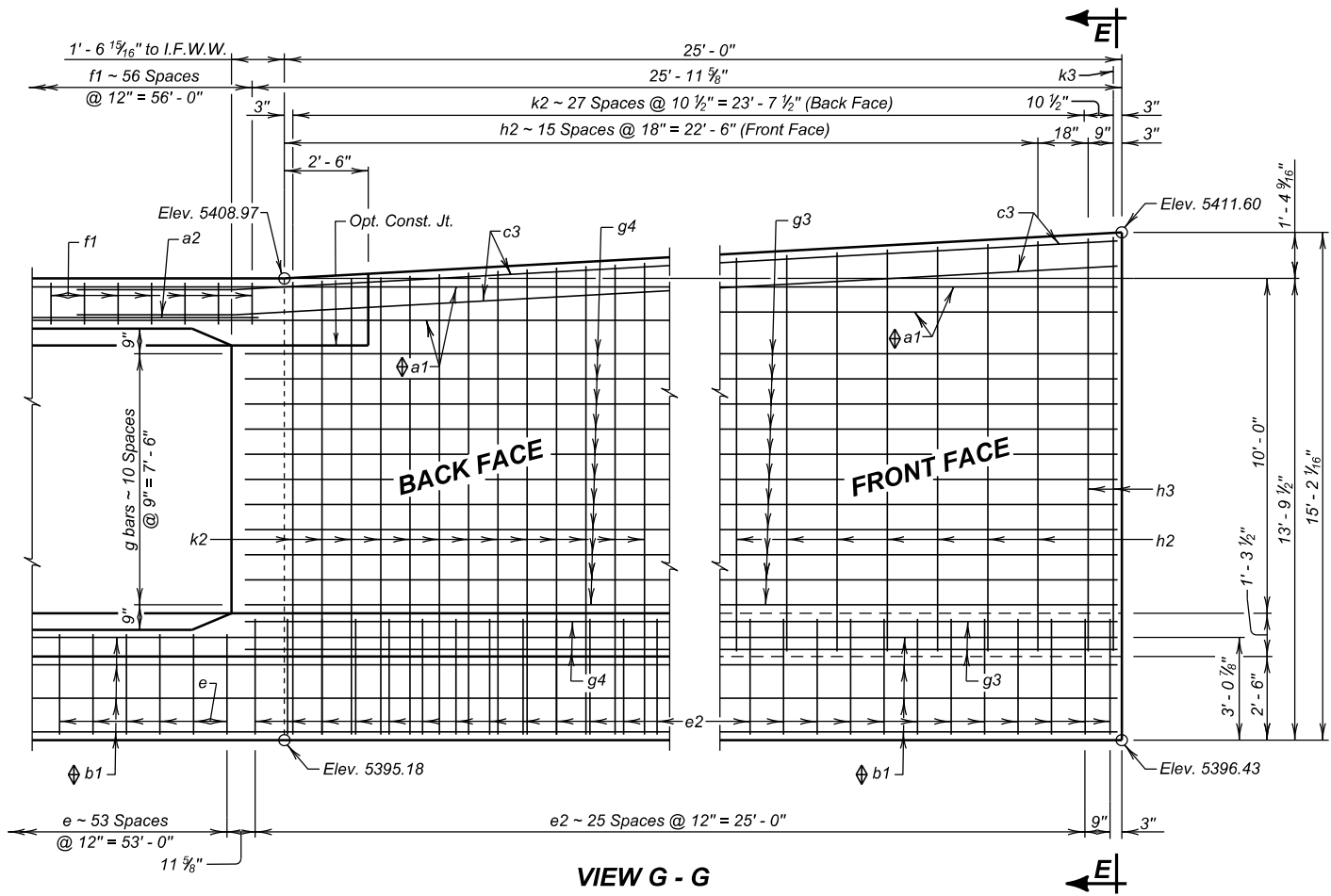
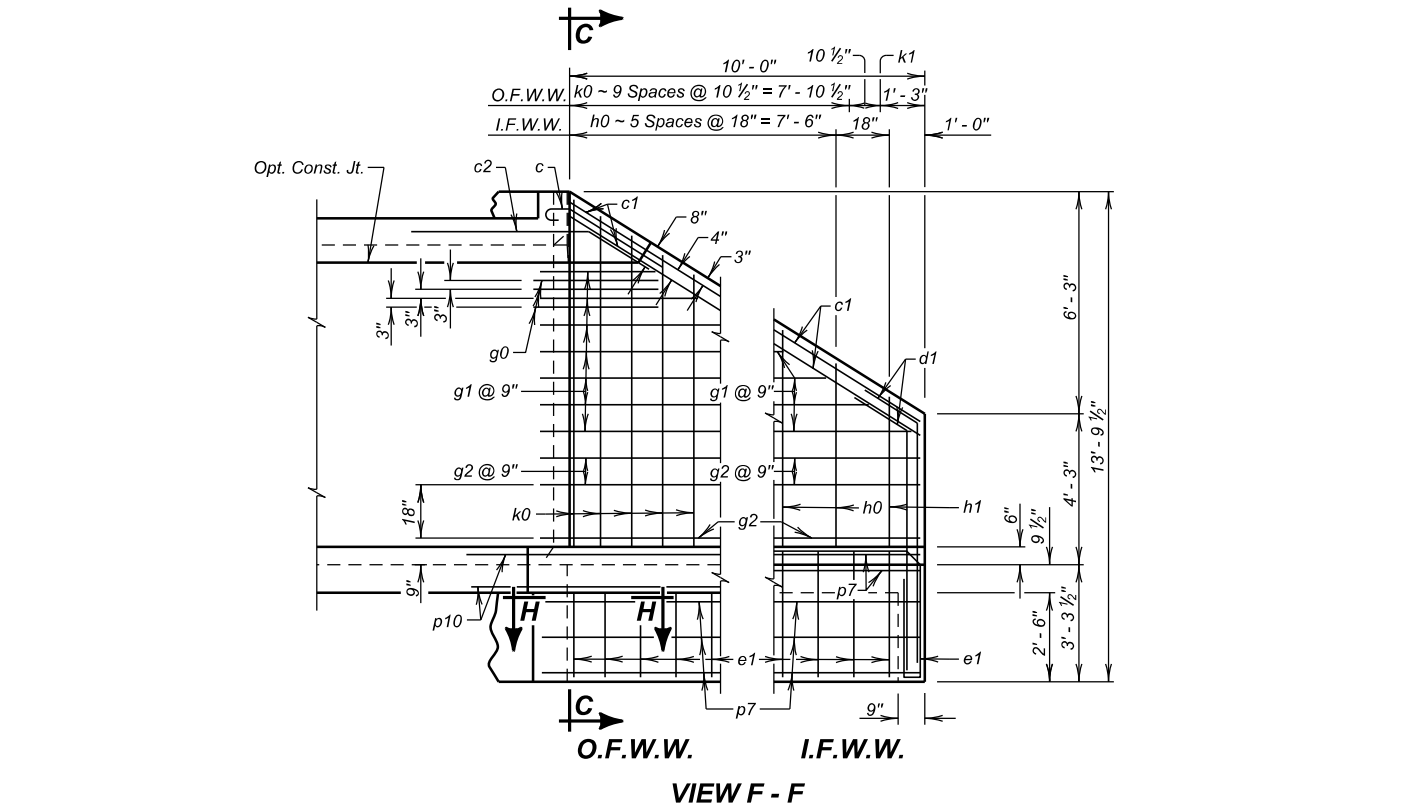
NOTES:
All dimensions are out to out of bars.
See cutting diagram.
Bend in field as necessary to fit.

ESTIMATED QUANTITIES			
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	37.3	4448	13.7

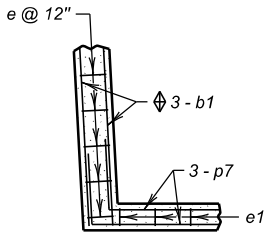
INLET DETAILS (A)
FOR
2 - 11' X 9' BOX CULVERT
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E8	E21

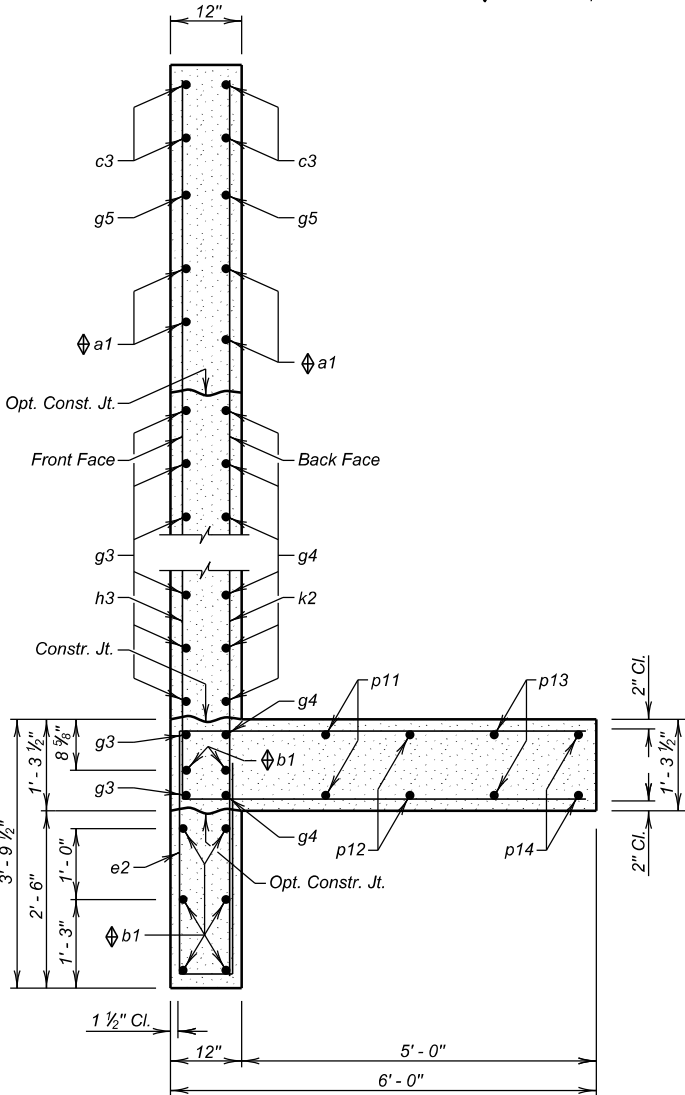


LEGEND FOR PLACING RE-STEEL
O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

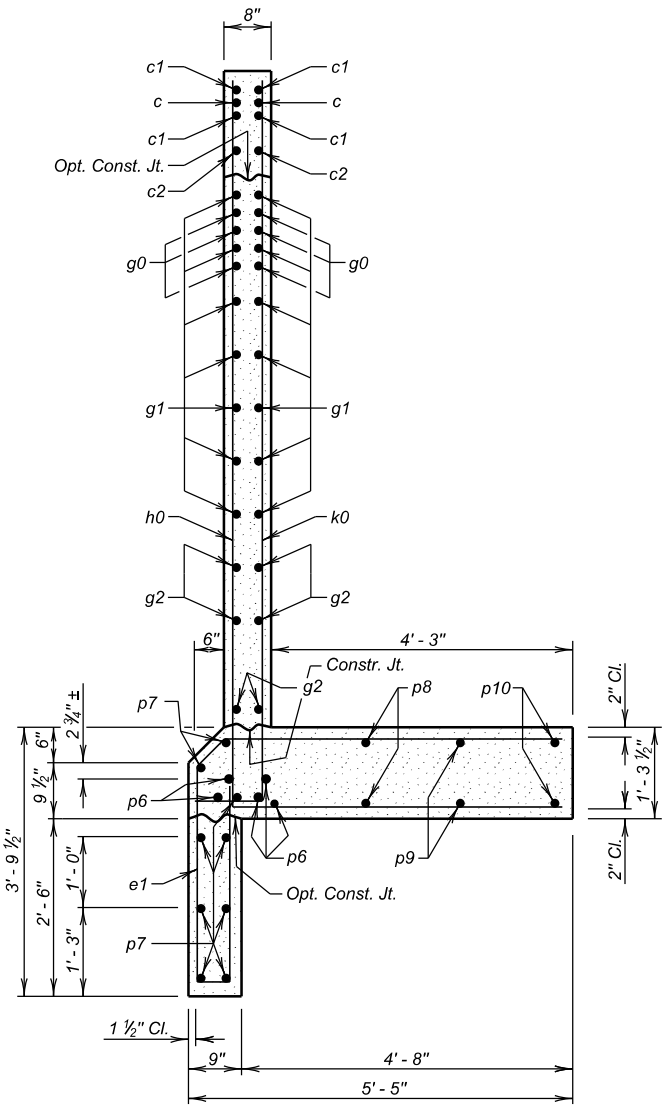


SECTION H - H

NOTE :
 Minimum Lap = 3' - 3"



SECTION E - E



SECTION C - C

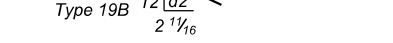
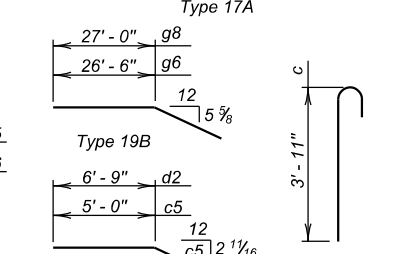
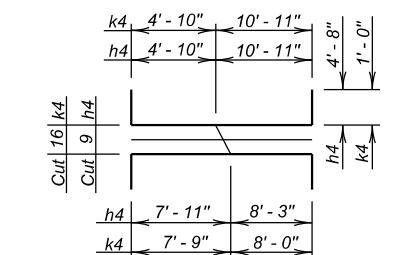
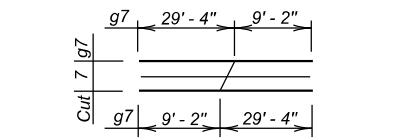
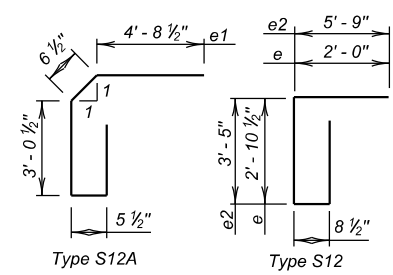
INLET DETAILS (B)
 FOR
2 - 11' X 9' BOX CULVERT
 OVER ICEBOX GULCH
 STA. 29 + 55.00
 STR. NO. 41-096-211
 65° RHF SKEW
 SEC. 22-T4N-R2E
 NH-B 014A(26)29
 HL-93

LAWRENCE COUNTY
 S. D. DEPT. OF TRANSPORTATION
 FEBRUARY 2025

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLT006	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	--------------------------------	------------------	-------------------------------------

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type
*	a1	8	6	42' - 6"	Str.
	a2	1	6	56' - 3"	Str.
	b1	16	6	42' - 3"	Str.
	c	2	5	4' - 6"	1A
	c4	4	5	28' - 6"	Str.
	c5	2	5	7' - 0"	19B
	d2	4	5	8' - 6"	19B
	e	55	4	8' - 3"	S12
	e1	31	4	11' - 6"	S12A
	e2	27	5	12' - 9"	S12
φ	f1	57	4	5' - 0"	S6A
	g3	13	4	28' - 6"	19B
	g4	13	4	29' - 0"	19B
	g6	6	5	5' - 0"	Str.
	g7	7	4	38' - 6"	Str.
	g8	6	4	29' - 9"	Str.
	h4	9	4	25' - 6"	17A
	h5	1	4	9' - 6"	17A
	h6	18	4	16' - 9"	17A
	h4	16	4	17' - 9"	17A
φ	k5	29	4	13' - 6"	Str.
	p6	5	6	7' - 0"	Str.
	p11	2	4	32' - 0"	Str.
	p12	2	4	34' - 6"	Str.
	p13	2	4	37' - 0"	Str.
	p14	2	4	39' - 6"	Str.
	p15	9	4	30' - 6"	Str.
	p16	2	4	32' - 0"	Str.
	p17	2	4	34' - 0"	Str.
	p18	2	4	35' - 9"	Str.



NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
✱ Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	45.2	5085	18.0

OUTLET DETAILS (A)

FOR

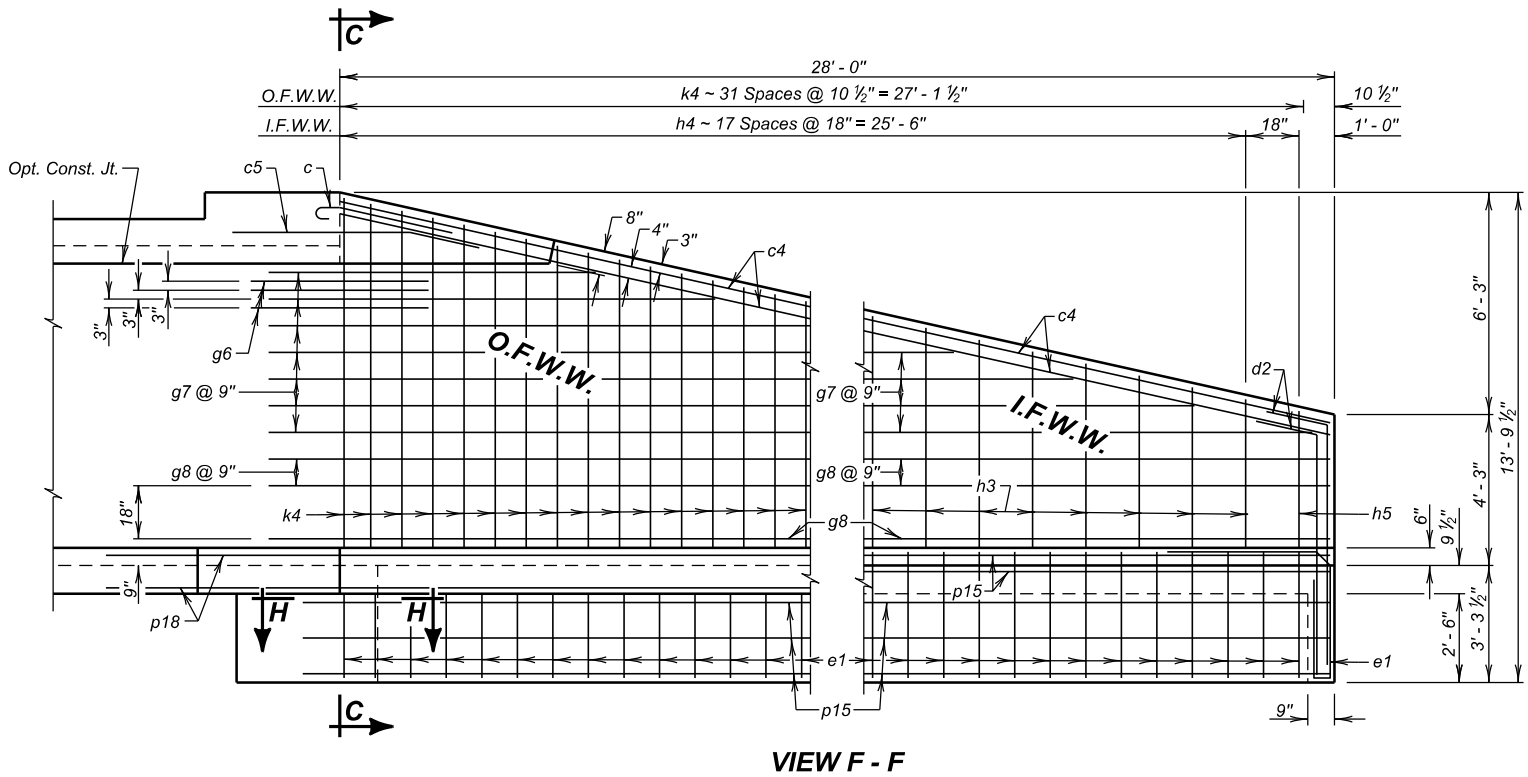
2 - 11' X 9' BOX CULVERT

OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211

65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

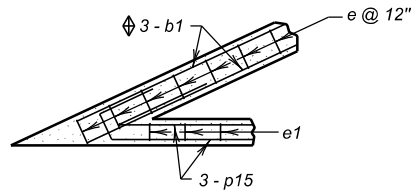
LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

DESIGNED BY AH 1 AWR06XI	CK. DES. BY CHM 06XI TA07	DRAFTED BY BT	<i>Steve A Johnson</i> BRIDGE ENGINEER
--------------------------------	---------------------------------	------------------	---



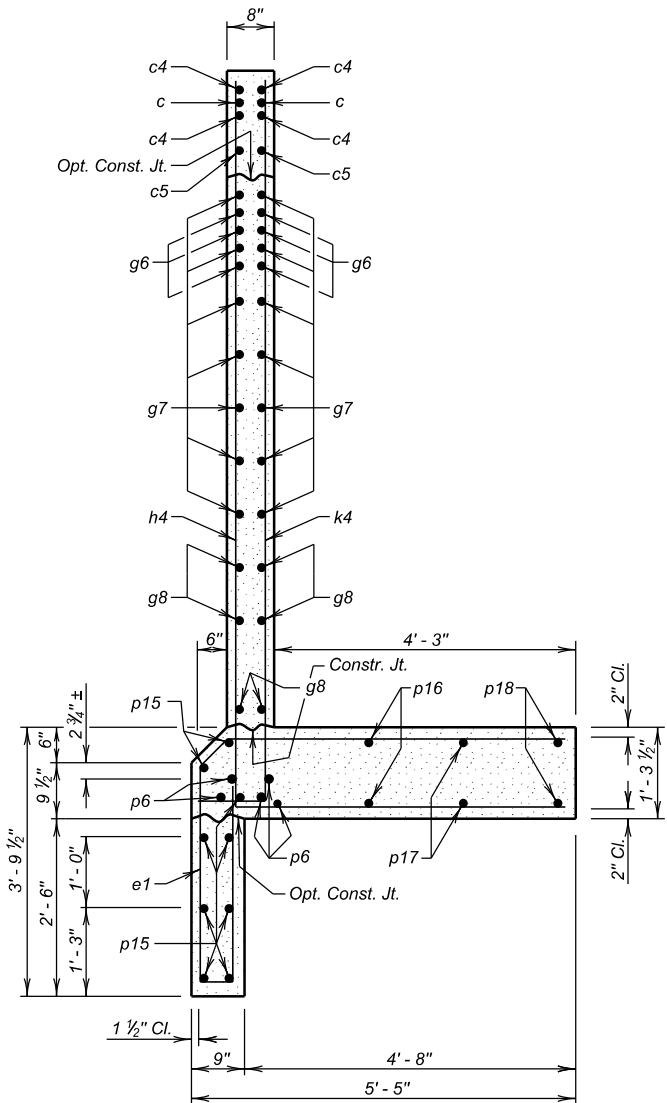
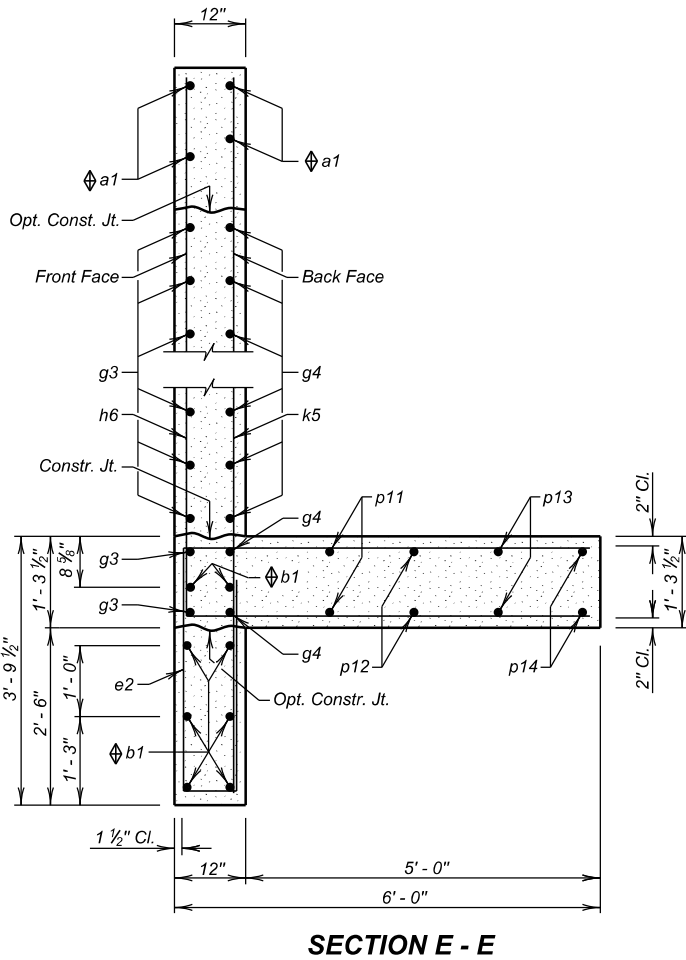
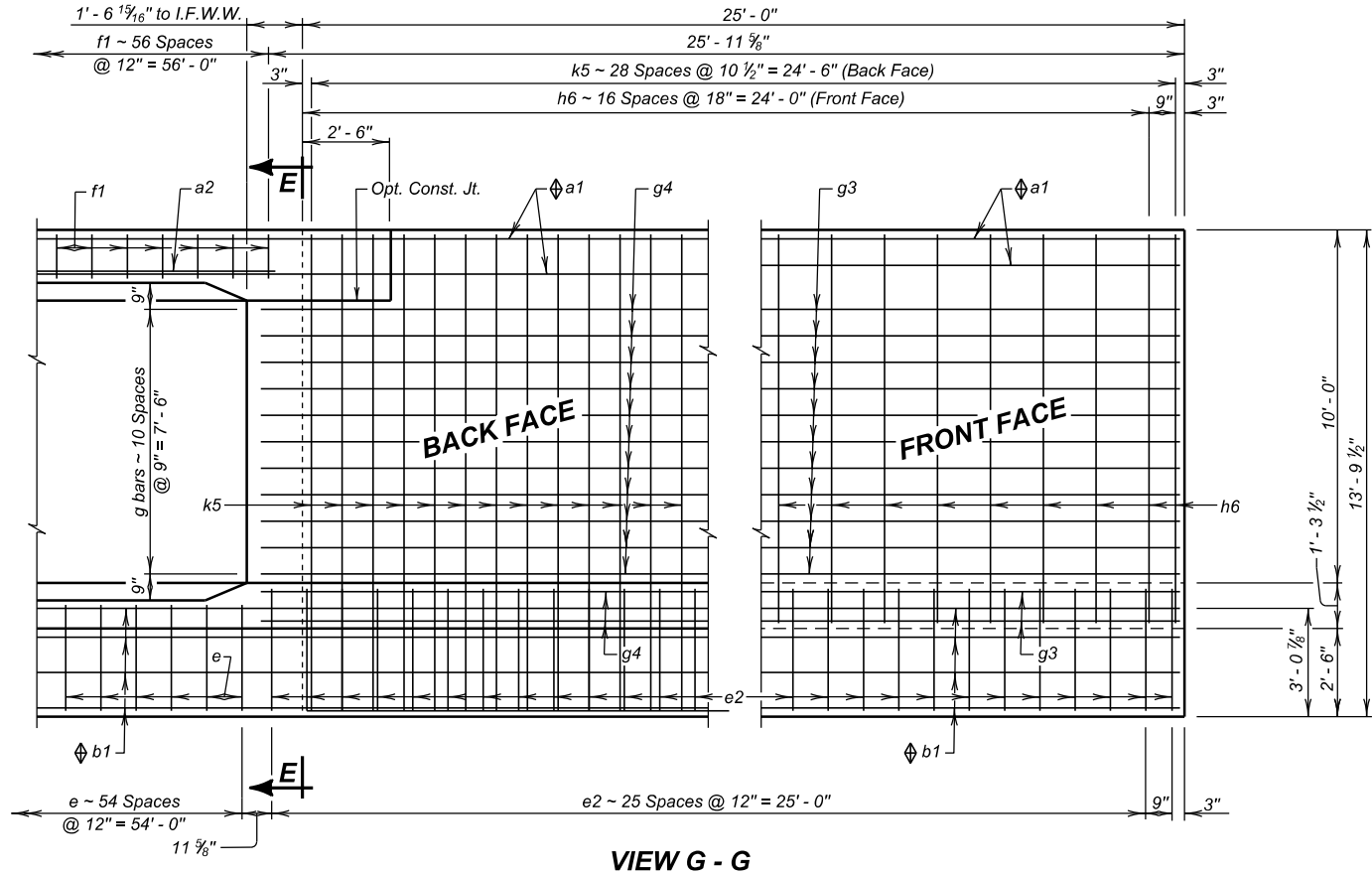
LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall



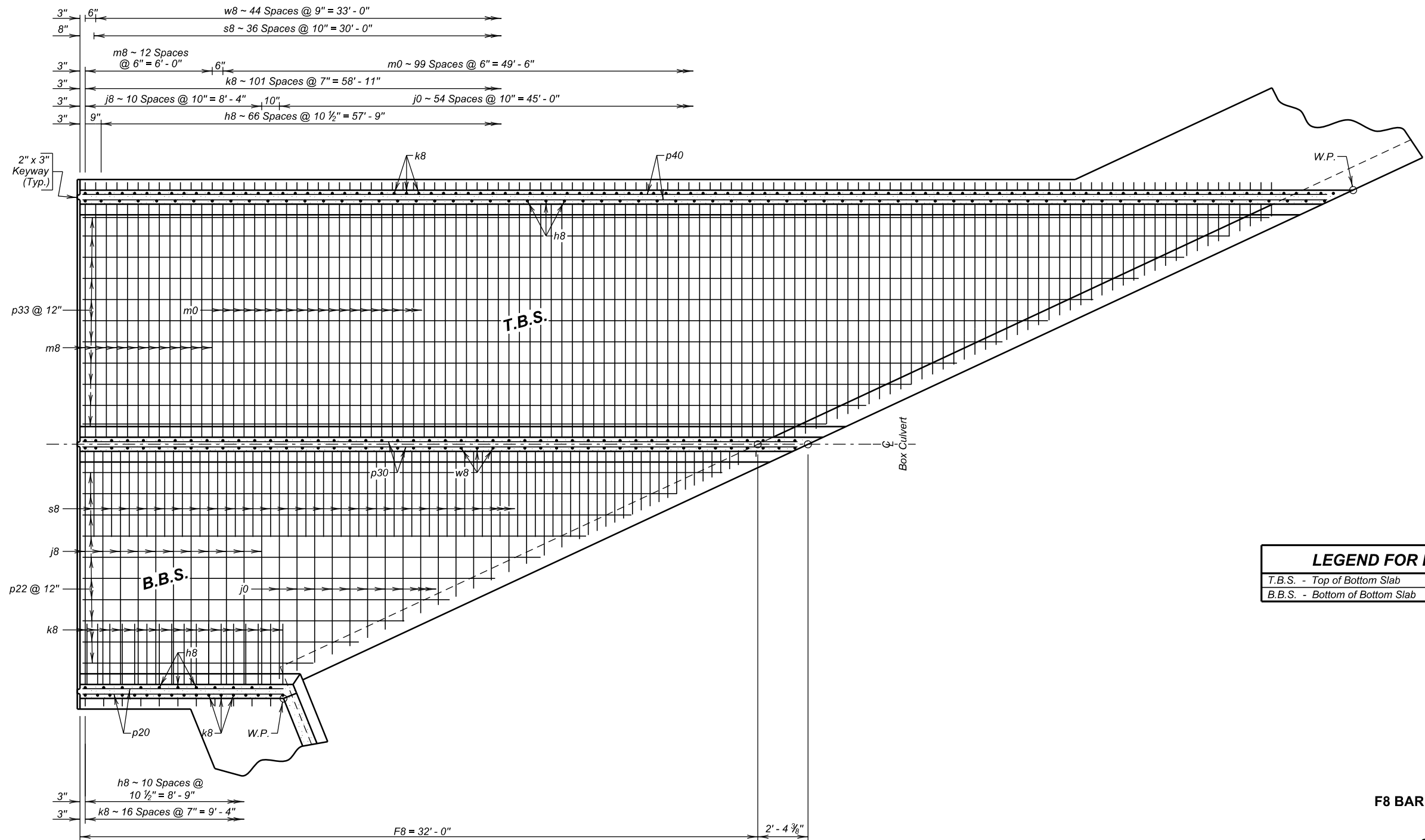
SECTION H - H

NOTE :
Minimum Lap = 3' - 3"



OUTLET DETAILS (B)
FOR
2 - 11' X 9' BOX CULVERT
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025



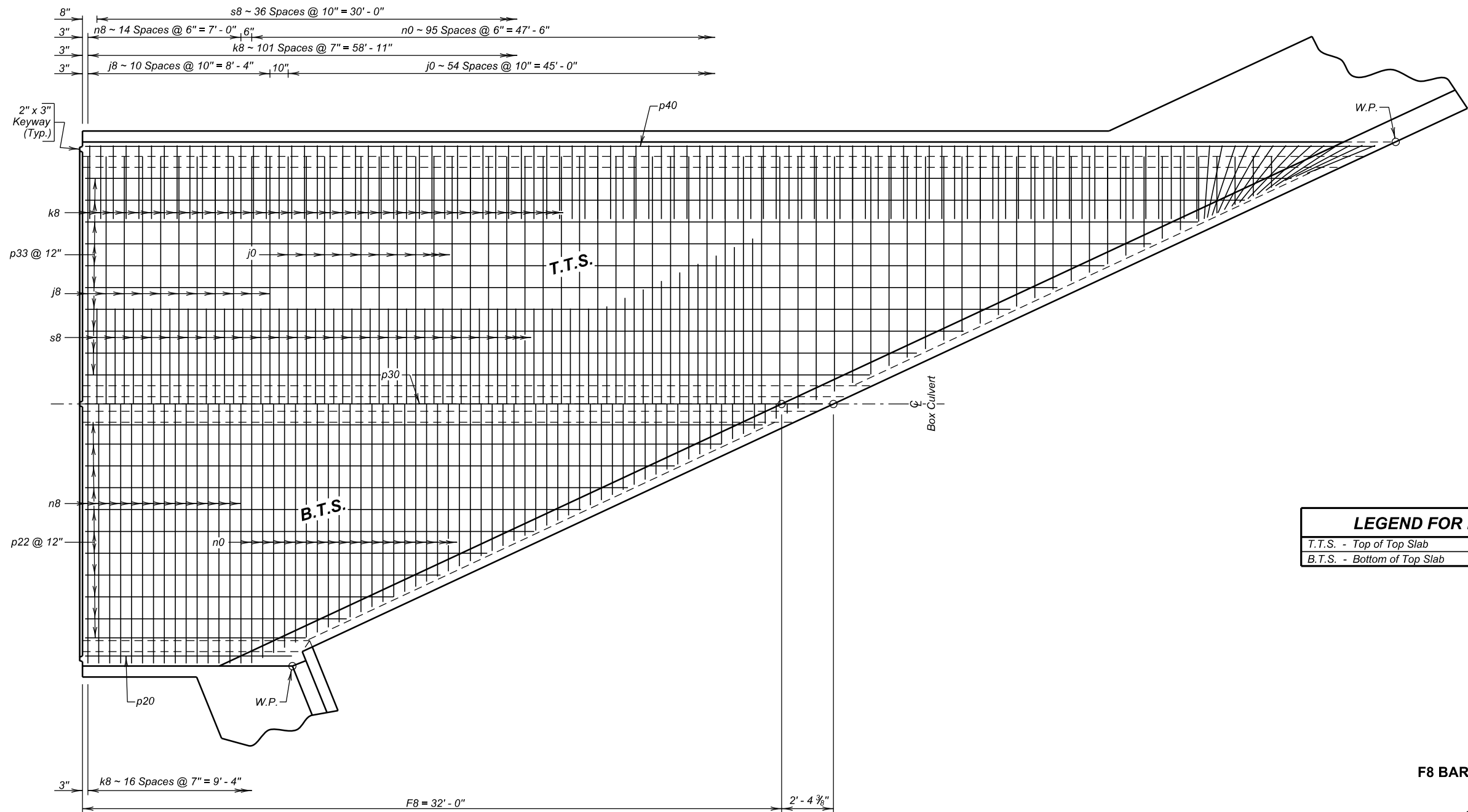
LEGEND FOR PLACING RE-STEEL
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab

PLAN
(Inlet End bottom steel shown, Outlet End similar by rotation)

F8 BARREL END SECTION DETAILS (32' - 0") (A)
FOR
2 - 11' X 9' BOX CULVERT
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E12	E21



PLAN
(Inlet End top steel shown, Outlet End similar by rotation)

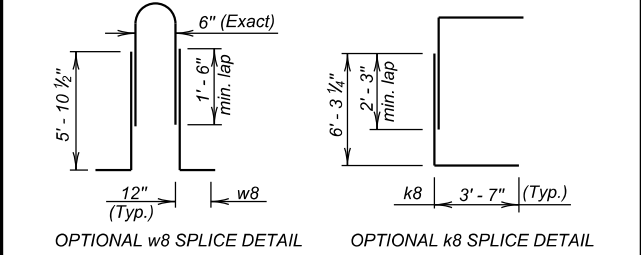
LEGEND FOR PLACING RE-STEEL
T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab

F8 BARREL END SECTION DETAILS (32' - 0") (B)
FOR
2 - 11' X 9' BOX CULVERT
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

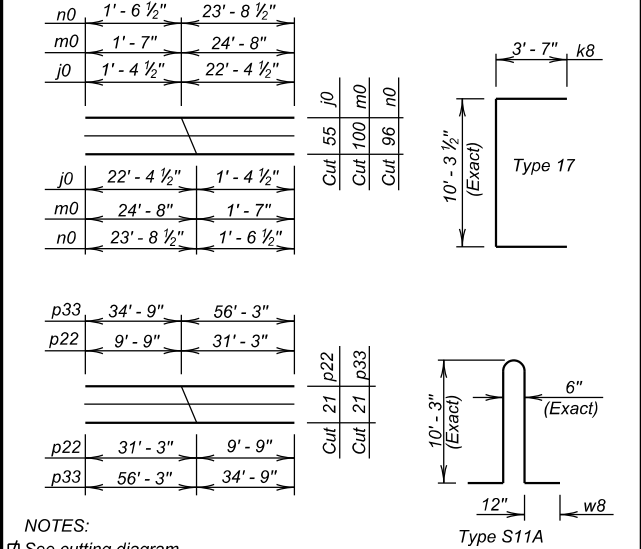
LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLTAT10	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	---------------------------------	------------------	-------------------------------------

REINFORCING SCHEDULE				
(For 2 - F8 Barrel End Sections)				
Mk.	No.	Size	Length	Type
a11	6	4	25' - 6"	Str.
a12	4	4	1' - 6"	19B
c11	48	4	4' - 0"	17A
h8	158	4	11' - 0"	17A
j0	110	6	23' - 9"	Str.
j8	44	6	22' - 9"	Str.
k8	238	5	17' - 6"	17
m0	100	5	26' - 3"	Str.
m8	26	5	24' - 9"	Str.
n0	96	5	25' - 3"	Str.
n8	30	5	23' - 9"	Str.
p20	32	4	9' - 6"	Str.
p22	42	4	41' - 0"	Str.
p30	30	4	33' - 6"	Str.
p33	42	4	91' - 0"	Str.
p40	32	4	58' - 6"	Str.
s8	148	6	8' - 9"	Str.
w8	92	4	22' - 9"	S11A



Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



NOTES:
See cutting diagram.
All dimensions are out to out of bars.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

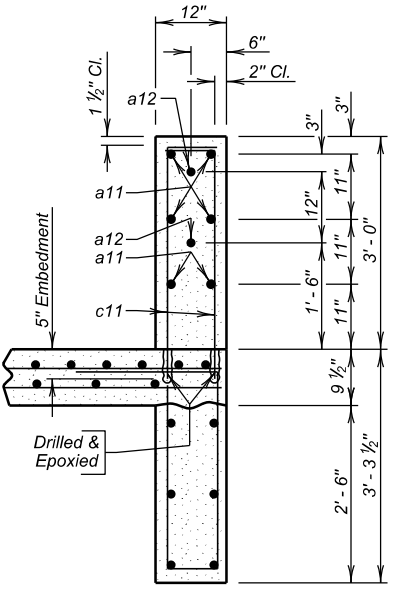
Quantity of a12 and c11 bars are not included in reinforcing steel.
Inlet end east barrel only.

LEGEND FOR PLACING RE-STEEL	
O.F.O.W.	- Outside Face of Outside Wall
I.F.O.W.	- Inside Face of Outside Wall
M. W.	- Middle Wall

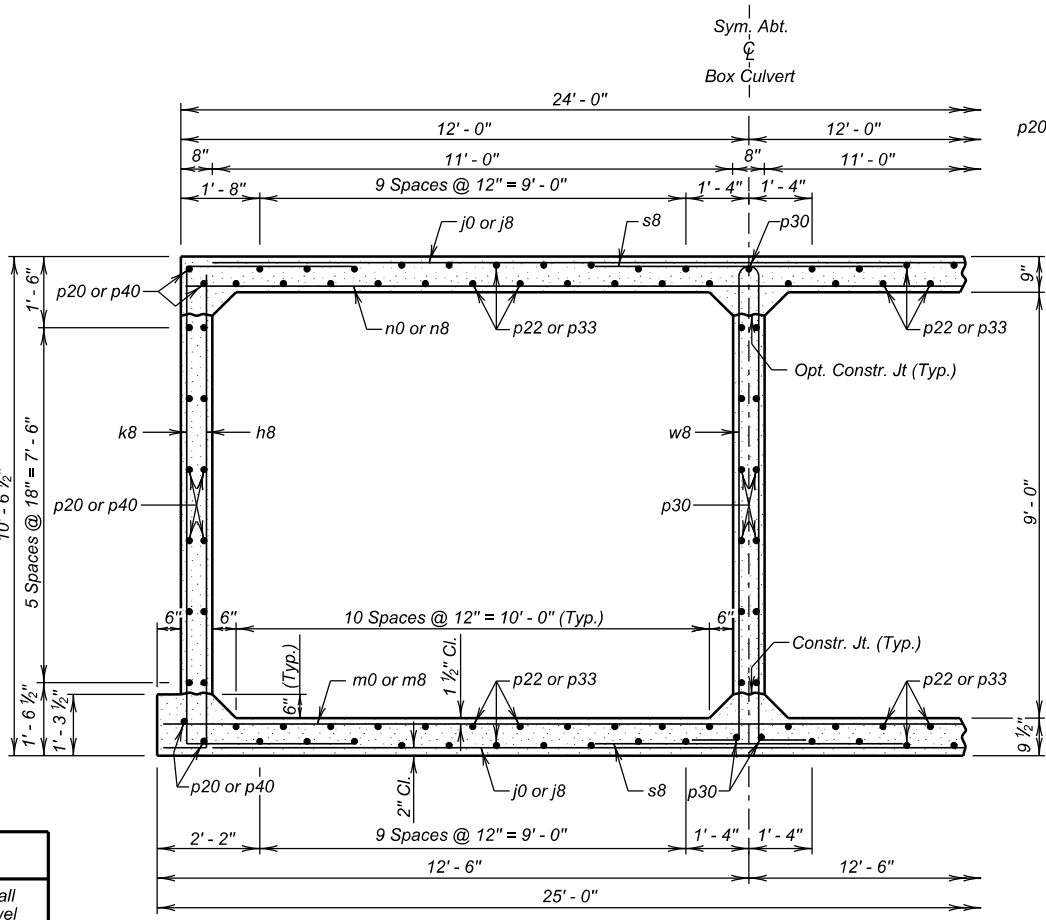
ESTIMATED QUANTITIES				
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert	Install Dowel in Concrete
UNIT	Cu.Yd.	Lb.	Cu.Yd.	Each
2 - F8 Barrel End Sections @ 32' - 0"	138.7	26887	46.9	52

INSTALLING DOWELS IN CONCRETE

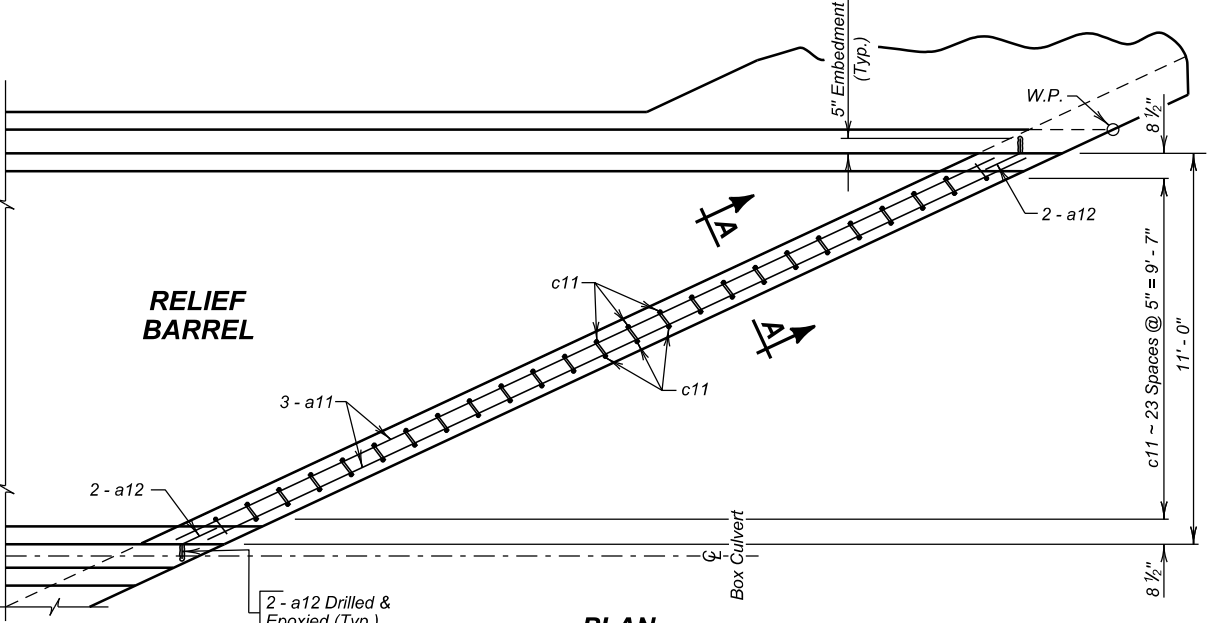
- Holes drilled in the existing concrete will be true and normal or as shown in the plans. Care will be taken not to damage the existing reinforcing steel. In spite of this precaution, the Contractor can still expect to encounter and have to drill through steel or shift dowel spacing as approved by the Engineer to miss the existing reinforcing steel. If the Contractor shifts the dowel spacing, the unused drill holes will be completely filled with epoxy resin specified in note number 2.
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3). Grade 1, 2 or 3 may be used for vertical dowels and Grade 3 epoxy will be used for all horizontal dowels.
- The diameter of the drilled holes will not be less than $\frac{1}{8}$ greater, nor more than $\frac{3}{8}$ inch greater than the diameter of the dowels, or as per the Manufacturer's recommendations. Holes will not be drilled using core bits. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes $\frac{1}{3}$ to $\frac{1}{2}$ full of epoxy, or as recommended by the Manufacturer, prior to insertion of the bar. Rotate the bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting methods will not be allowed. Care will be taken to ensure no voids when installing a12, b1, c11, and z2 bars.
- No loads will be applied to the epoxy grouted bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Dowels will be deformed bars conforming to ASTM A615 Grade 60.
- The cost of drilling holes, epoxy resin, bars, installation, and other incidental items will be included in the contract unit price per each for Install Dowel in Concrete.



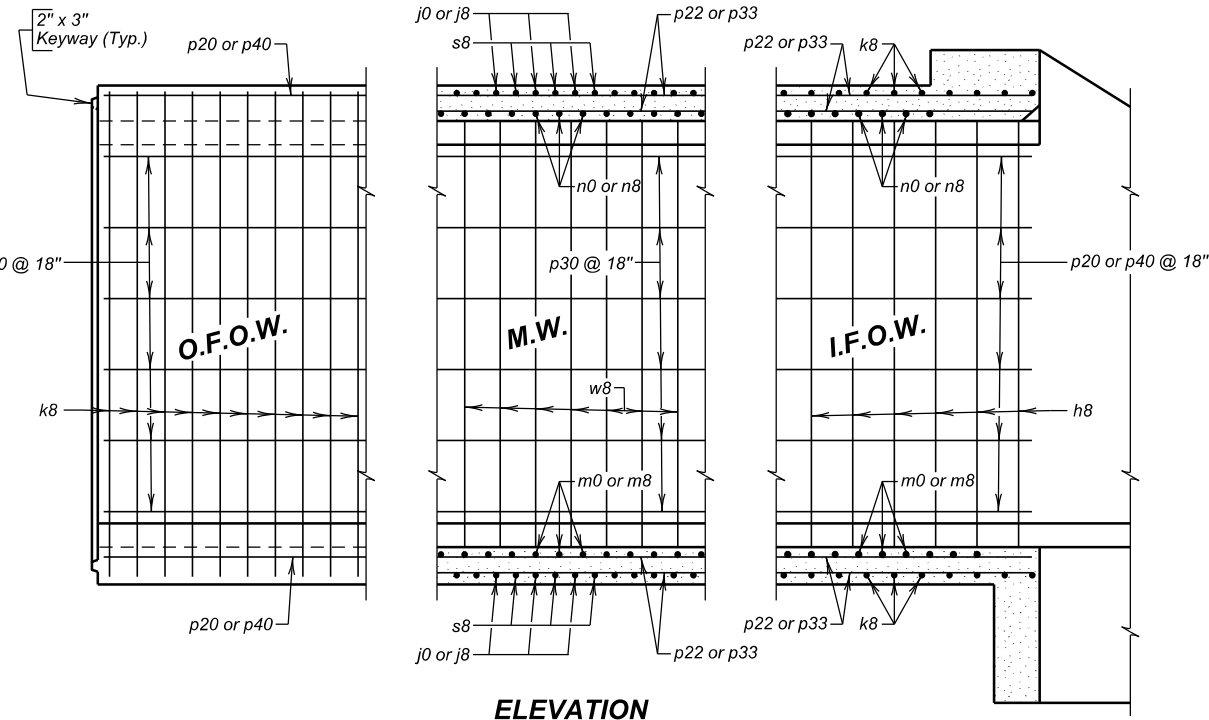
SECTION A - A



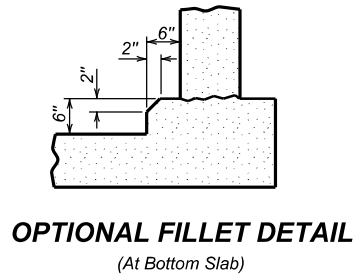
F8 BARREL HALF SECTION
(8' - 0" Maximum Fill)



PLAN
(Wier - Inlet End East Barrel only)



ELEVATION



OPTIONAL FILLET DETAIL
(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

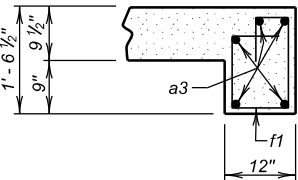
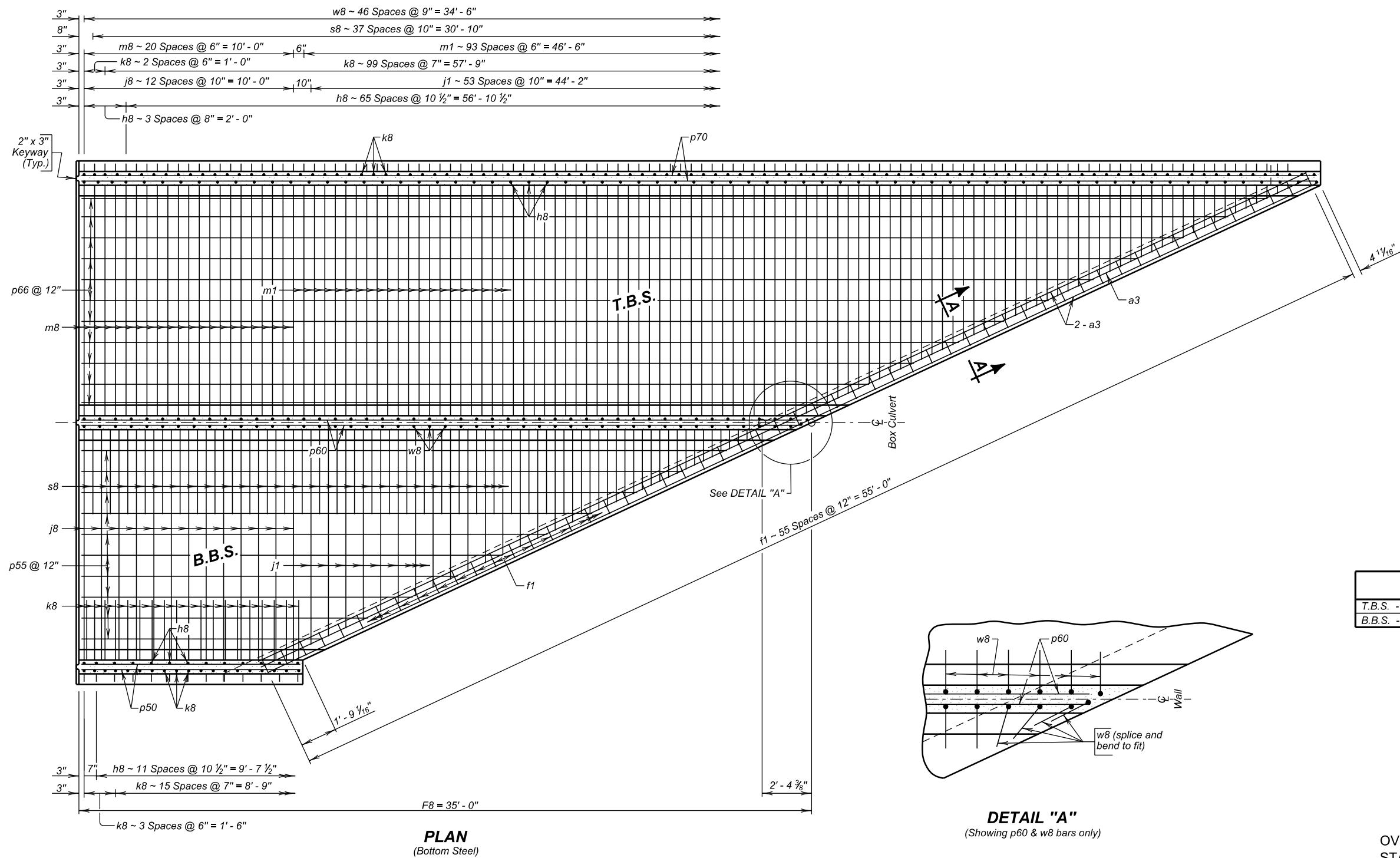
F8 BARREL END SECTION DETAILS (32' - 0") (C)
FOR
2 - 11' X 9' BOX CULVERT
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2025

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLTAT11	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	---------------------------------	------------------	-------------------------------------

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E14	E21



SECTION A - A
(At Bottom Slab)

LEGEND FOR PLACING RE-STEEL
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab

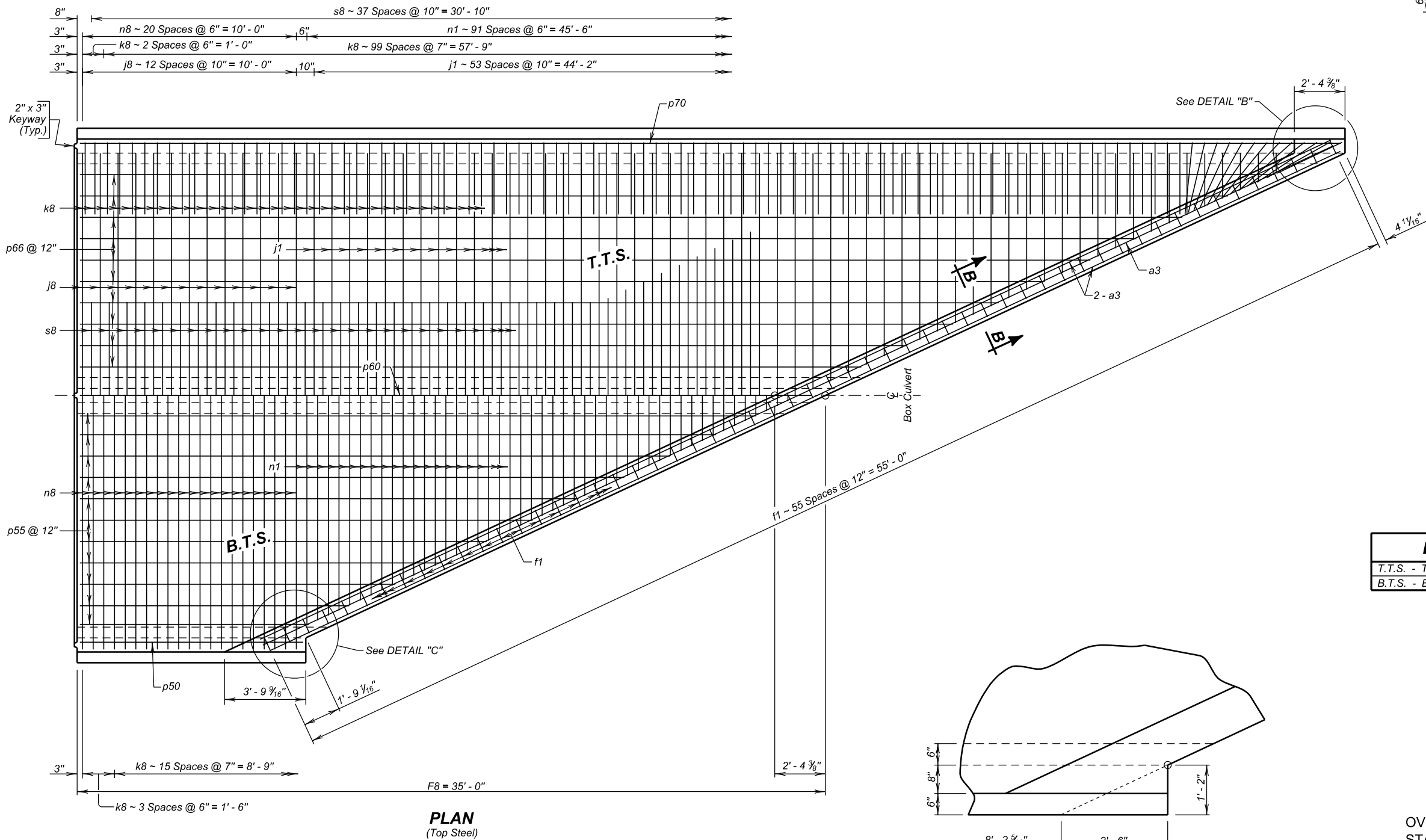
F8 BARREL INTERIOR SECTION DETAILS (35' - 0") (A)
FOR
2 - 11' X 9' BOX CULVERT

OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

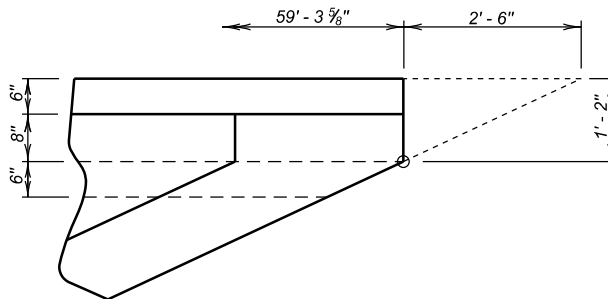
LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLT A12	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	---------------------------------	------------------	-------------------------------------

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E15	E21

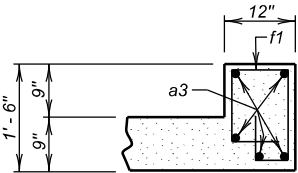


PLAN
(Top Steel)



DETAIL "B"

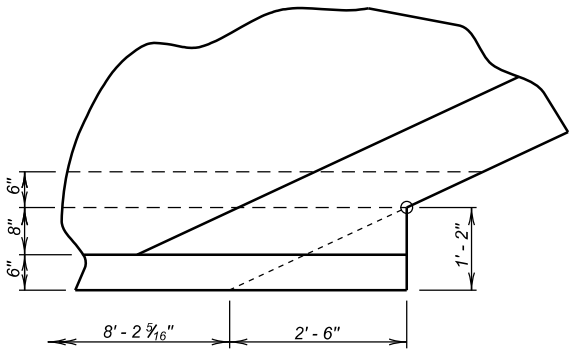
Note: Reinforcing steel not shown for clarity.



SECTION B - B
(At Top Slab)

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab



DETAIL "C"

F8 BARREL INTERIOR SECTION DETAILS (35' - 0") (B)

FOR

2 - 11' X 9' BOX CULVERT

OVER ICEBOX GULCH

STA. 29 + 55.00

STR. NO. 41-096-211

65° RHF SKEW

SEC. 22-T4N-R2E

NH-B 014A(26)29

HL-93

LAWRENCE COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2025

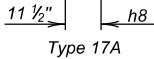
13 OF 19

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLT A13	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	---------------------------------	------------------	-------------------------------------

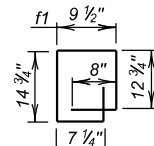
REINFORCING SCHEDULE

(For 2 - F8 Barrel Interior Sections)

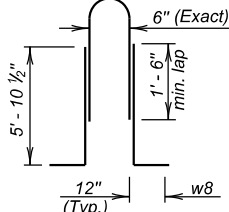
Mk.	No.	Size	Length	Type	Bending Details
a3	20	4	55' - 0"	Str.	
f1	224	4	5' - 0"	S6A	
h8	164	4	11' - 0"	17A	
j1	108	6	23' - 3"	Str.	
j8	52	6	22' - 9"	Str.	
k8	242	5	17' - 6"	17	
m1	94	5	24' - 6"	Str.	
m8	42	5	24' - 9"	Str.	
n1	92	5	24' - 0"	Str.	
n8	42	5	23' - 9"	Str.	
p50	32	4	10' - 3"	Str.	
p55	42	4	42' - 3"	Str.	
p60	30	4	34' - 0"	Str.	
p66	42	4	92' - 3"	Str.	
p70	32	4	59' - 0"	Str.	
s8	152	6	8' - 9"	Str.	
w8	94	4	22' - 9"	S11A	
z1	6	5	3' - 6"	Str.	
z2	82	6	2' - 3"	Str.	



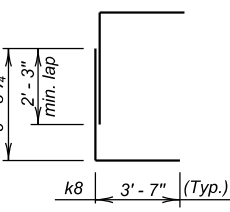
Type 17A



Type S6A



OPTIONAL w8 SPLICE DETAIL

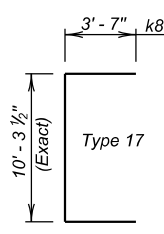


OPTIONAL k8 SPLICE DETAIL

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

n1	1' - 4 1/2"	22' - 7 1/2"
m1	1' - 5"	23' - 1"
j1	1' - 4"	21' - 11"

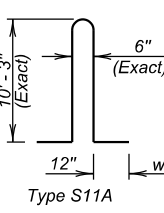
11	m1	n1
Cut 54	Cut 94	Cut 92



Type 17

p66	35' - 8"	56' - 7"
p55	10' - 5"	31' - 10"
p55	31' - 10"	10' - 5"
p66	56' - 7"	35' - 8"

p55	p66
Cut 21	Cut 21



Type S11A

NOTES:

See cutting diagram.
All dimensions are out to out of bars.

Quantity of z2 bars is not included in reinforcing steel.
See F8 BARREL END SECTION DETAILS (32' - 0") (C) Sheet for Installing Dowels in Concrete notes.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

LEGEND FOR PLACING RE-STEEL

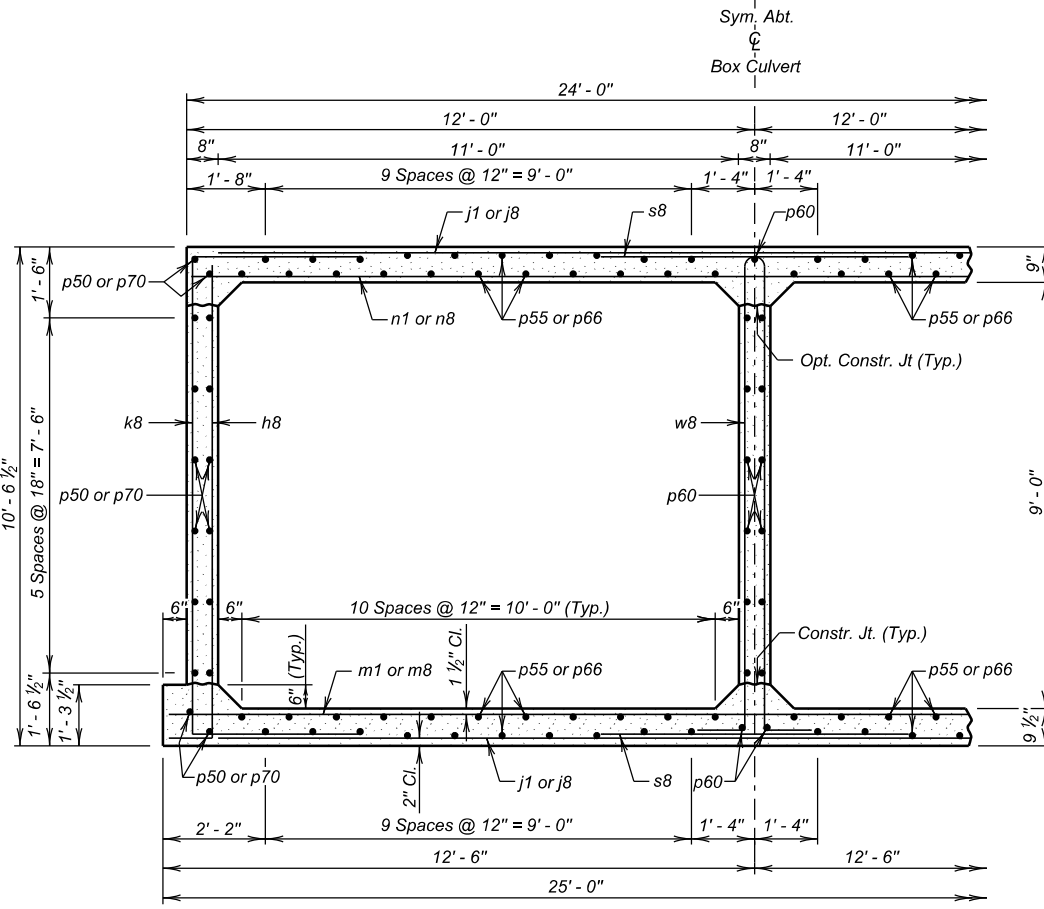
O.F.O.W. - Outside Face of Outside Wall

I.F.O.W. - Inside Face of Outside Wall

M. W. - Middle Wall

ESTIMATED QUANTITIES

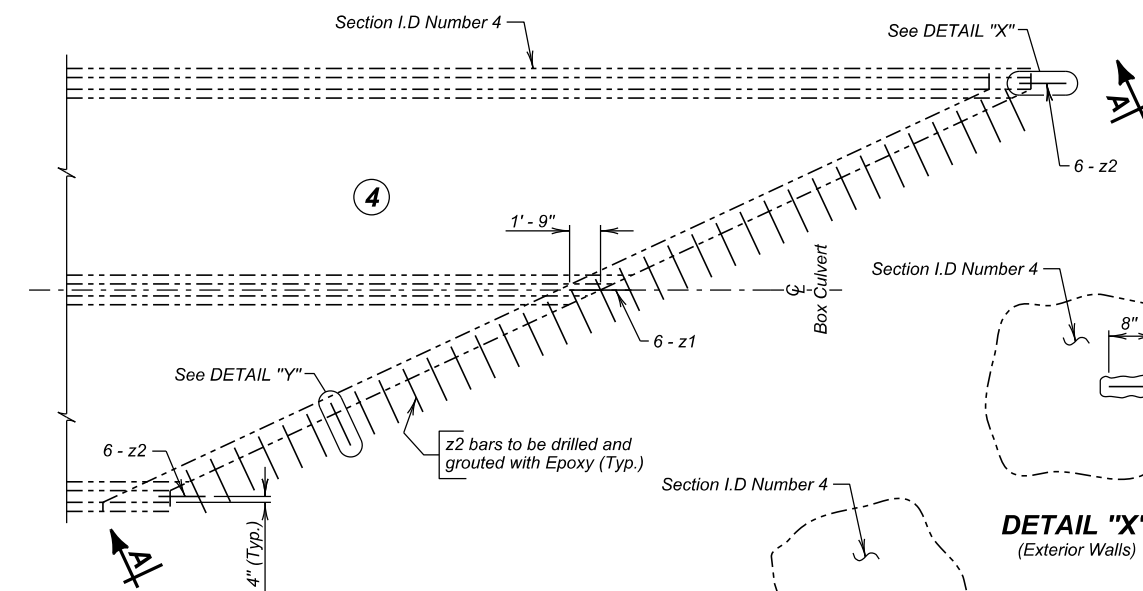
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert	Install Dowel in Concrete
UNIT	Cu. Yd.	Lb.	Cu. Yd.	Each
2 - F8 Barrel Interior Sections @ 35' - 0"	154.9	28866	51.3	82



F8 BARREL HALF SECTION

(8' - 0" Maximum Fill)

NOTE: Dowel bars are to be installed into Section I.D. Number 4 before construction of adjacent Section I.D. Number 5.



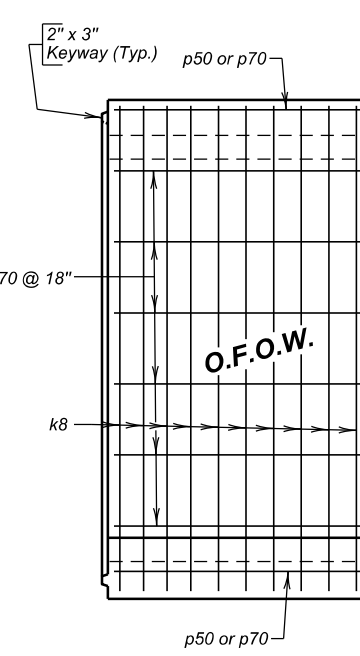
PLAN - DOWEL DETAILS

DETAIL "X"

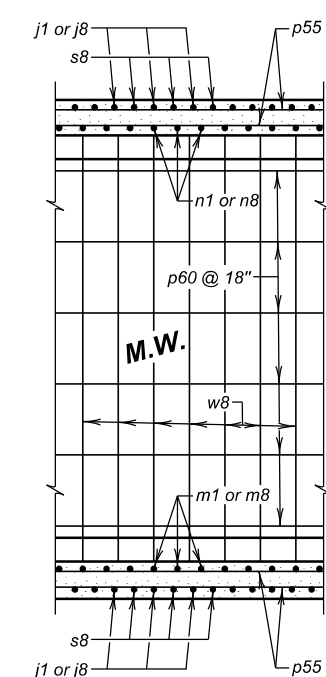
(Exterior Walls)

DETAIL "Y"

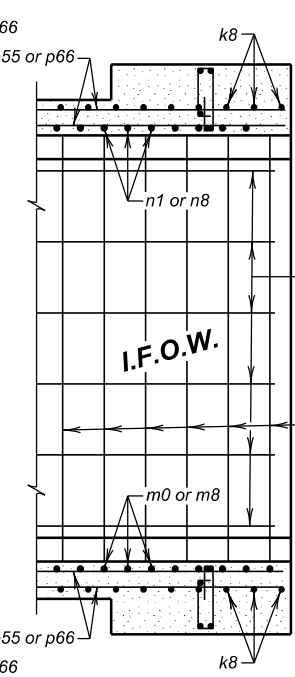
(Top & Bottom Slab)



O.F.O.W.

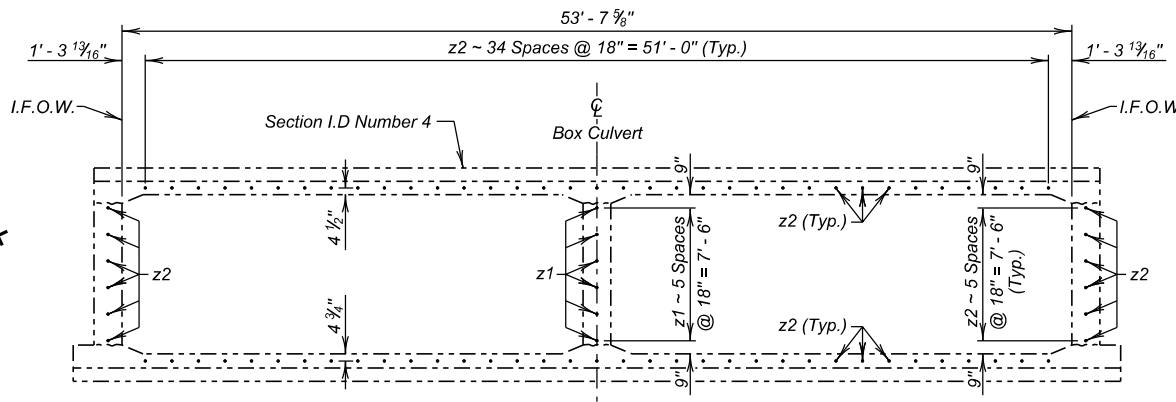


M.W.



I.F.O.W.

ELEVATION



VIEW A - A

(Dowel Locations)

F8 BARREL INTERIOR SECTION DETAILS (35' - 0") (C)

FOR

2 - 11' X 9' BOX CULVERT

OVER ICEBOX GULCH

STA. 29 + 55.00

STR. NO. 41-096-211

65° RHF SKEW

SEC. 22-T4N-R2E

NH-B 014A(26)29

HL-93

LAWRENCE COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2025

OPTIONAL FILLET DETAIL

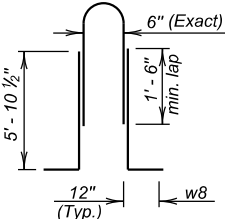
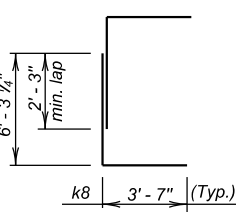
(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLTAT4	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
-------------------------------	--------------------------------	------------------	-------------------------------------

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E17	E21

REINFORCING SCHEDULE					Bending Details	
Mk.	No.	Size	Length	Type		
h8	88	4	11' - 0"	17A		
j8	92	6	22' - 9"	Str.		
k8	134	5	17' - 6"	Str.		
m8	76	5	24' - 9"	Str.		
n8	76	5	23' - 9"	Str.		
p0	131	4	37' - 9"	Str.		
s8	90	6	8' - 9"	Str.		
w8	51	4	22' - 9"	S11A		
z1	124	5	3' - 6"	Str.		

 5' - 10 1/2" 6" (Exact) 1' - 6" min. lap min. lap 12" (Typ.) w8	 6' - 3 1/4" 2' - 3" min. lap min. lap 3' - 7" (Typ.) k8
OPTIONAL w8 SPLICE DETAIL	OPTIONAL k8 SPLICE DETAIL

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:
All dimensions are out to out of bars.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

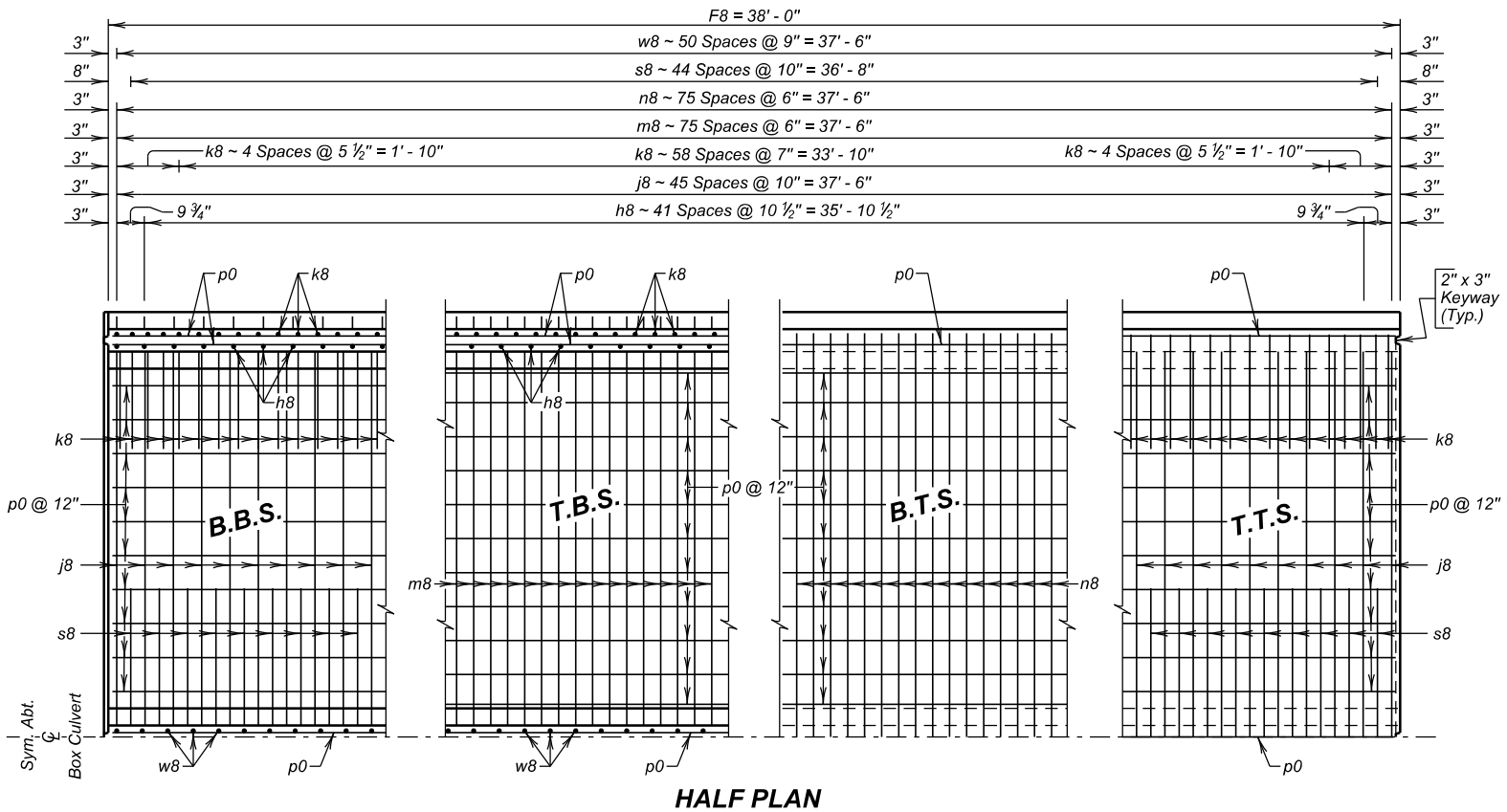
ESTIMATED QUANTITIES			
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
1 - F8 Barrel Interior Section @ 38' - 0"	80.6	15795	27.9

LEGEND FOR PLACING RE-STEEL	
T.T.S. - Top of Top Slab	
B.T.S. - Bottom of Top Slab	
T.B.S. - Top of Bottom Slab	
B.B.S. - Bottom of Bottom Slab	
O.F.O.W. - Outside Face of Outside Wall	
I.F.O.W. - Inside Face of Outside Wall	
M. W. - Middle Wall	

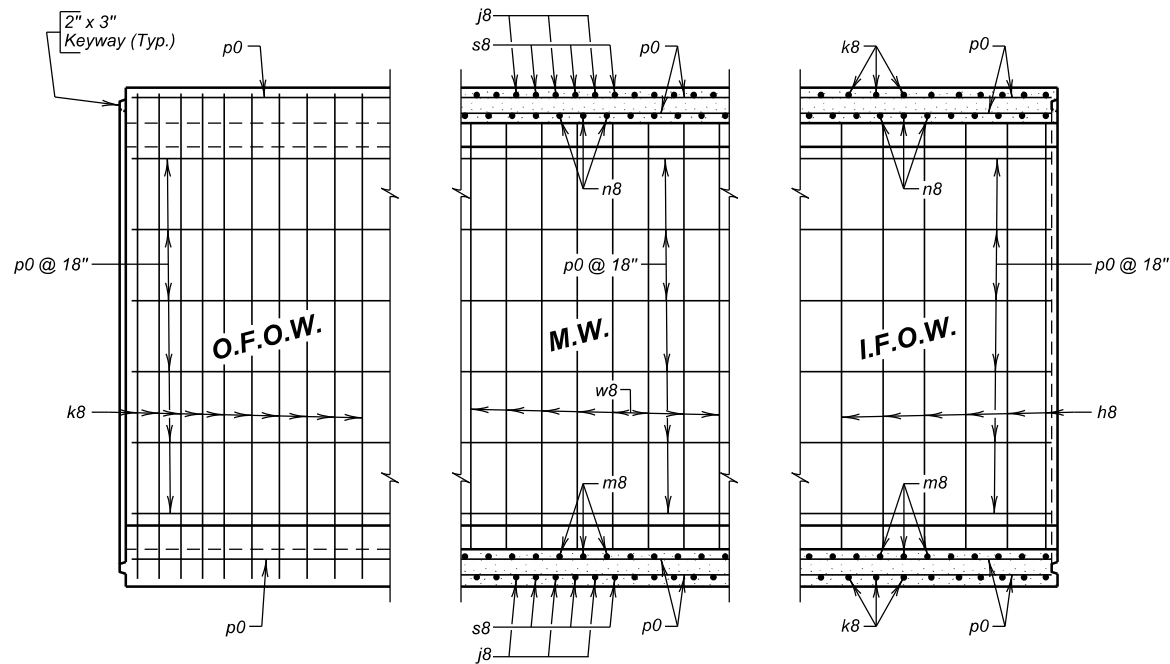
F8 BARREL INTERIOR SECTION DETAILS (38' - 0")
FOR
2 - 11' X 9' BOX CULVERT
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

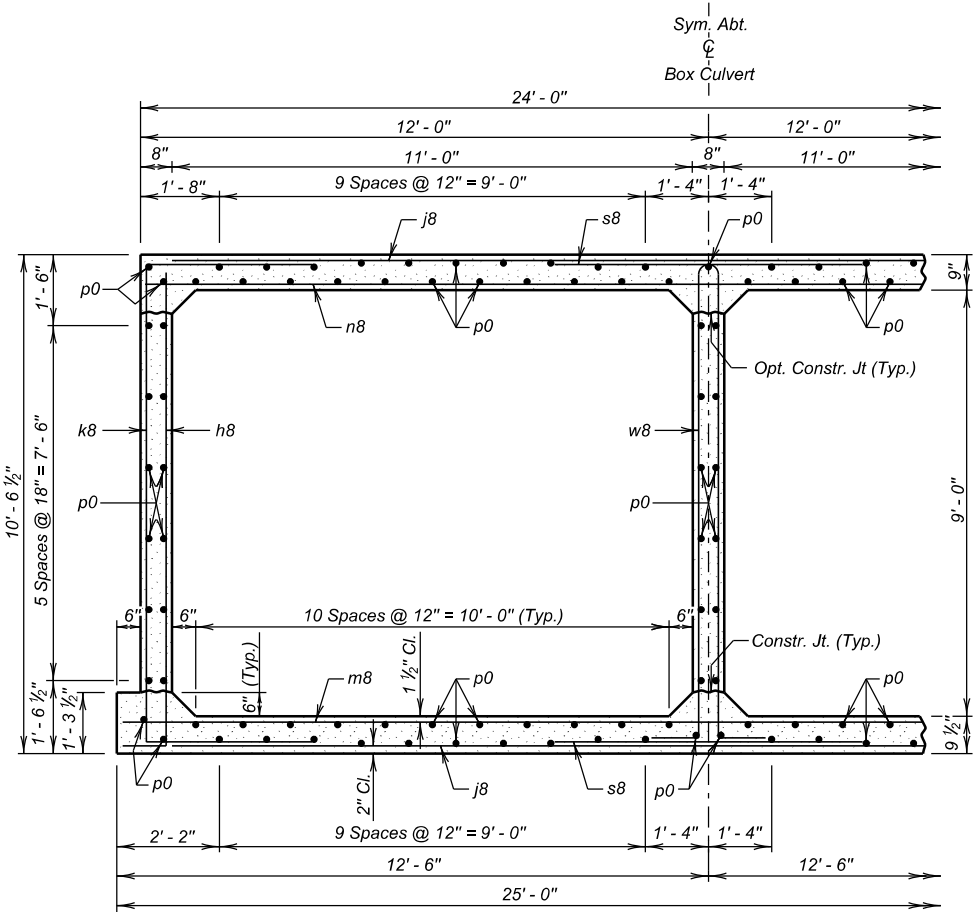
DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLTAT15	DRAFTED BY BT	 BRIDGE ENGINEER
-------------------------------	---------------------------------	------------------	---------------------



HALF PLAN



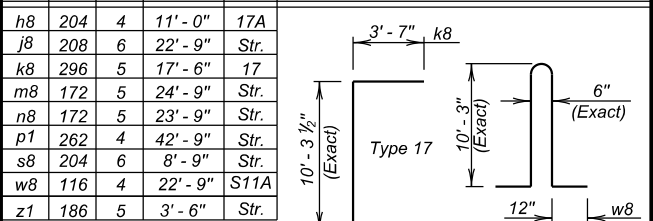
ELEVATION



F8 BARREL HALF SECTION
(8' - 0" Maximum Fill)

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-B 014A(26)29	E18	E21

REINFORCING SCHEDULE
(For 2 - F8 Barrel Interior Sections)

Mk.	No.	Size	Length	Type	Bending Details
h8	204	4	11' - 0"	17A	
j8	208	6	22' - 9"	Str.	
k8	296	5	17' - 6"	17	
m8	172	5	24' - 9"	Str.	
n8	172	5	23' - 9"	Str.	
p1	262	4	42' - 9"	Str.	
s8	204	6	8' - 9"	Str.	
w8	116	4	22' - 9"	S11A	
z1	186	5	3' - 6"	Str.	

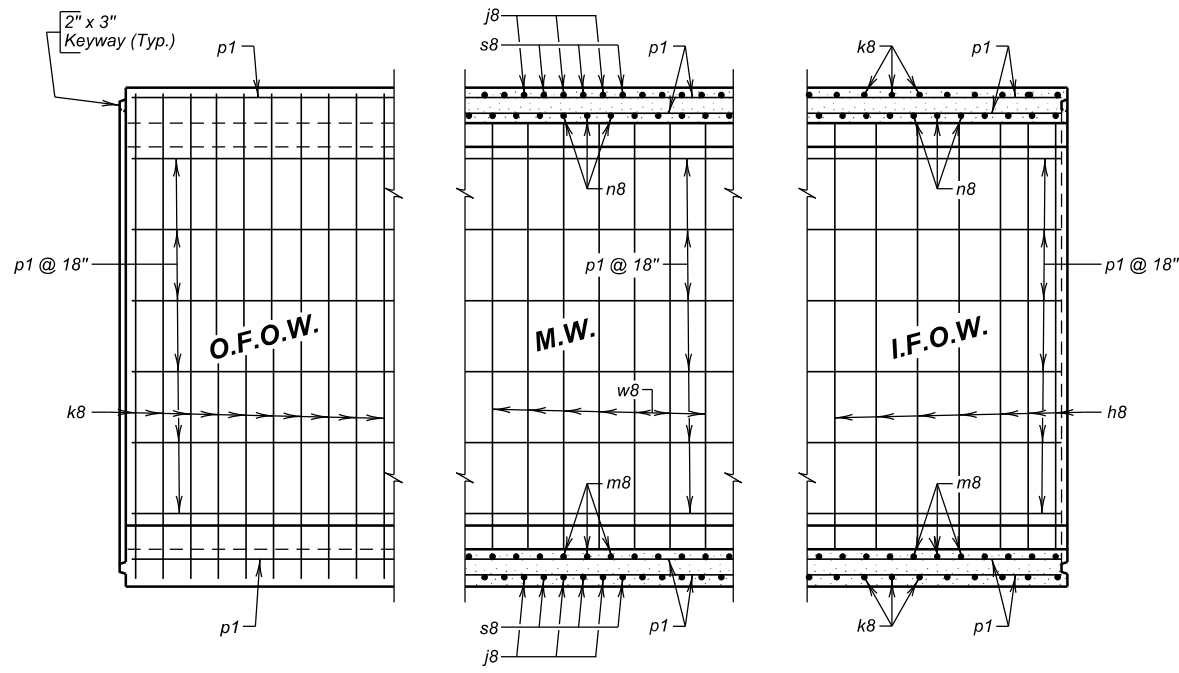
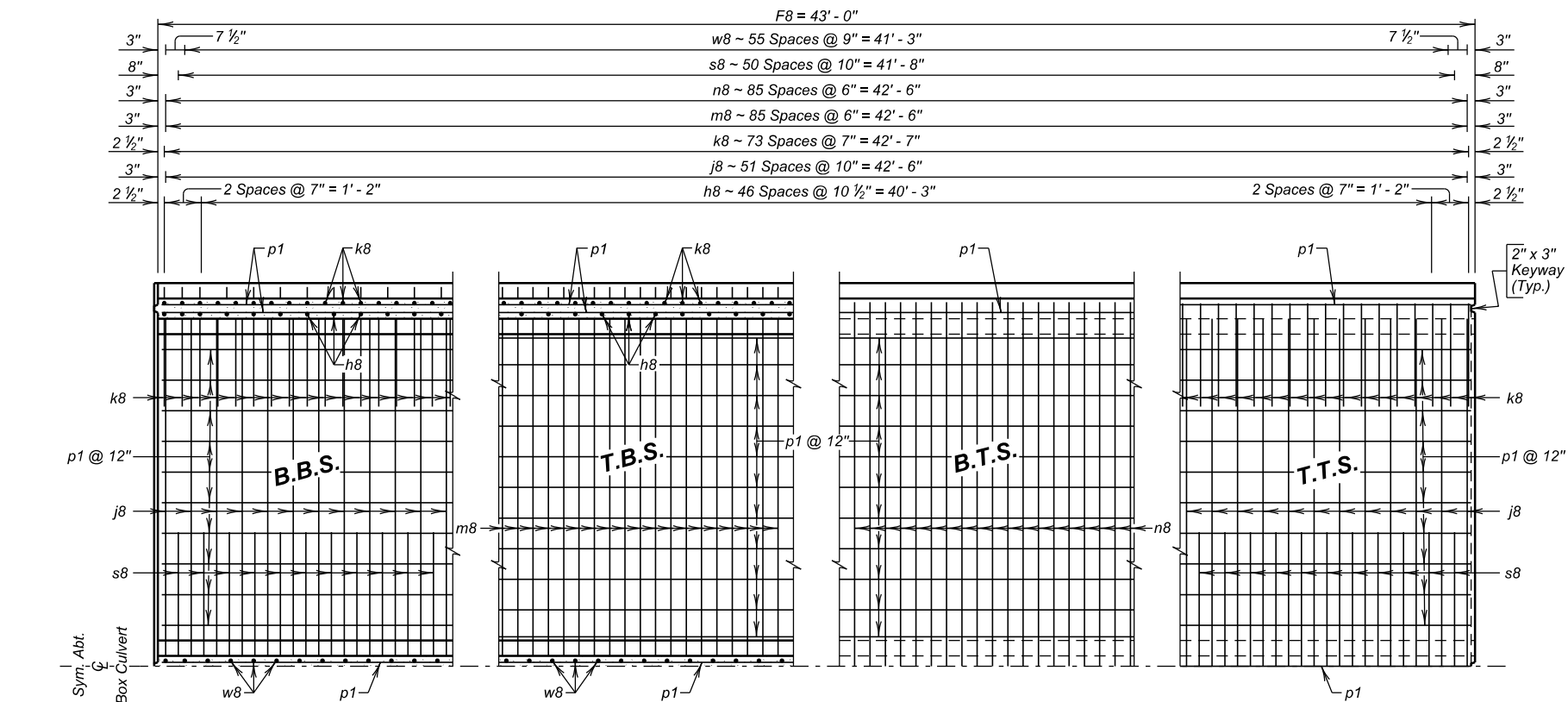
OPTIONAL FILLET DETAIL

(At Bottom Slab)

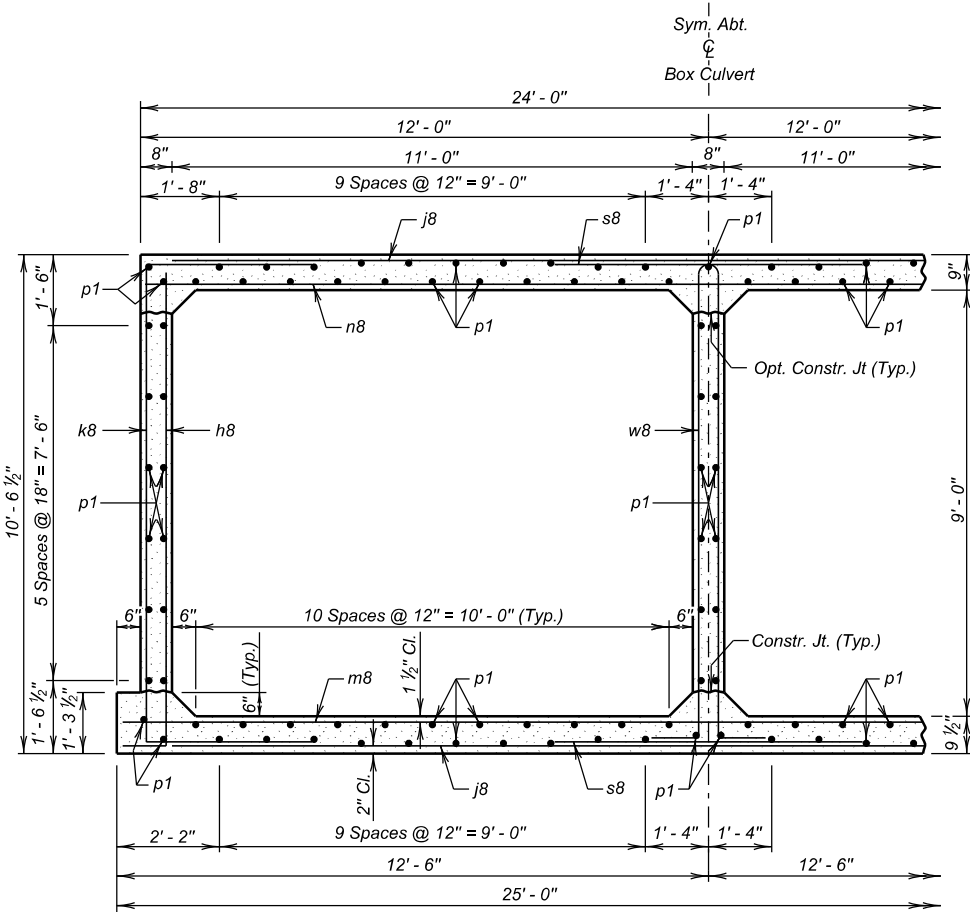
NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Number of z1 bars shown is for 3 construction joints.

HALF PLAN



ELEVATION



F8 BARREL HALF SECTION

(8' - 0" Maximum Fill)

NOTES:
All dimensions are out to out of bars.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
2 - F8 Barrel Interior Sections @ 43' - 0"	182.5	35315	63.1

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.O.W. - Outside Face of Outside Wall
I.F.O.W. - Inside Face of Outside Wall
M. W. - Middle Wall

F8 BARREL INTERIOR SECTION DETAILS (43' - 0")

FOR

2 - 11' X 9' BOX CULVERT

OVER ICEBOX GULCH

STA. 29 + 55.00

STR. NO. 41-096-211

65° RHF SKEW

SEC. 22-T4N-R2E

NH-B 014A(26)29

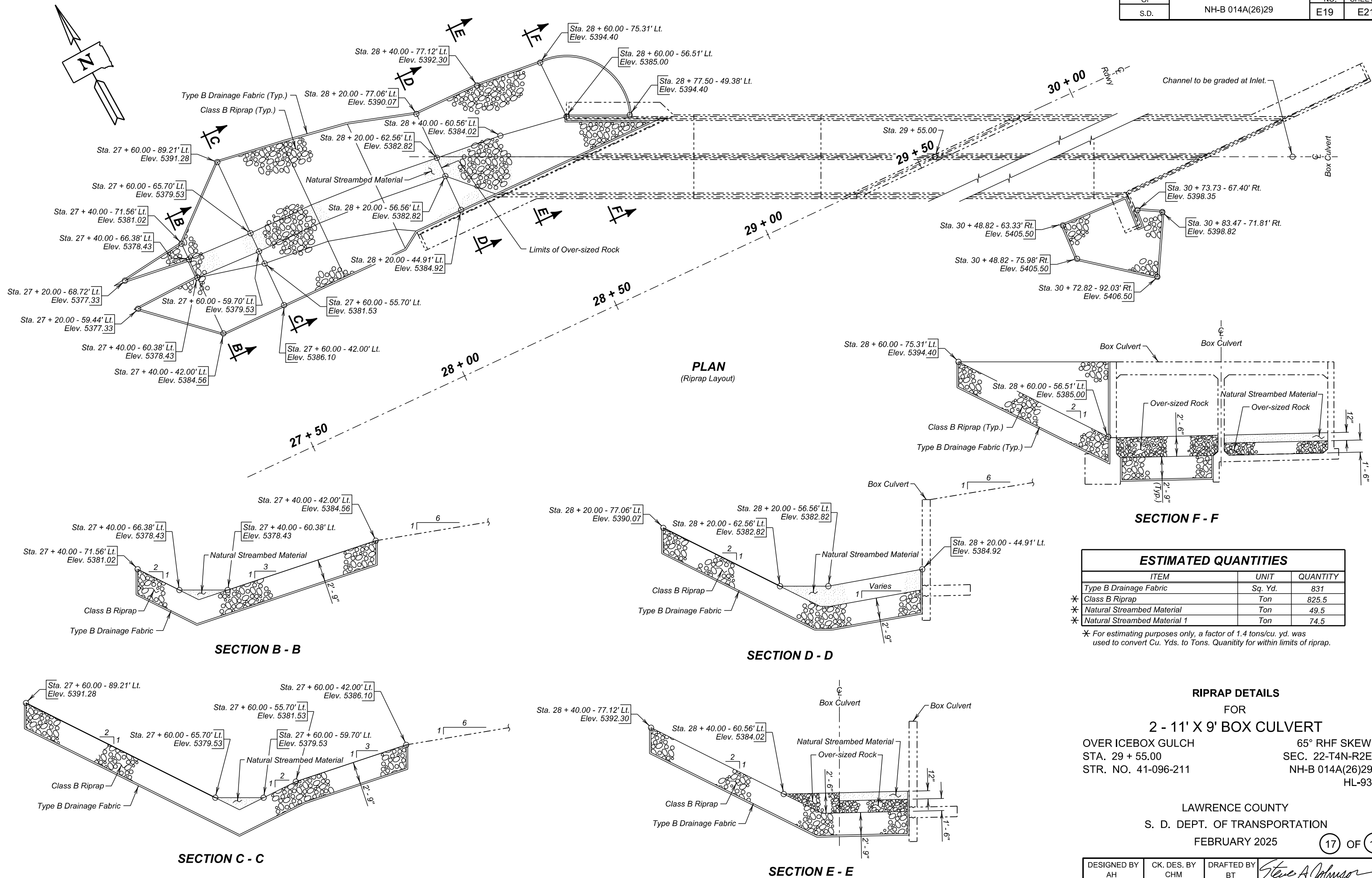
HL-93

LAWRENCE COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2025

DESIGNED BY AH LAWR06XL	CK. DES. BY CHM 06XLTAT16	DRAFTED BY BT	 BRIDGE ENGINEER
-------------------------------	---------------------------------	------------------	--

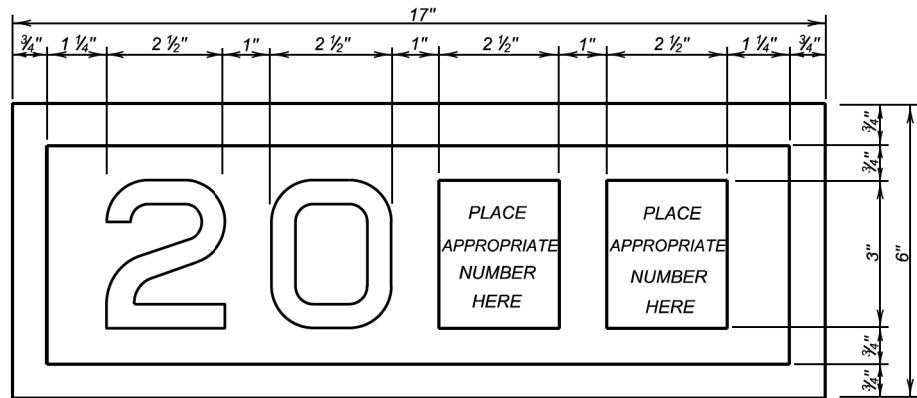


ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Type B Drainage Fabric	Sq. Yd.	831
Class B Riprap	Ton	825.5
Natural Streambed Material	Ton	49.5
Natural Streambed Material 1	Ton	74.5

* For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yds. to Tons. Quantity for within limits of riprap.

RIPRAP DETAILS
FOR
2 - 11' X 9' BOX CULVERT
OVER ICEBOX GULCH
STA. 29 + 55.00
STR. NO. 41-096-211
65° RHF SKEW
SEC. 22-T4N-R2E
NH-B 014A(26)29
HL-93

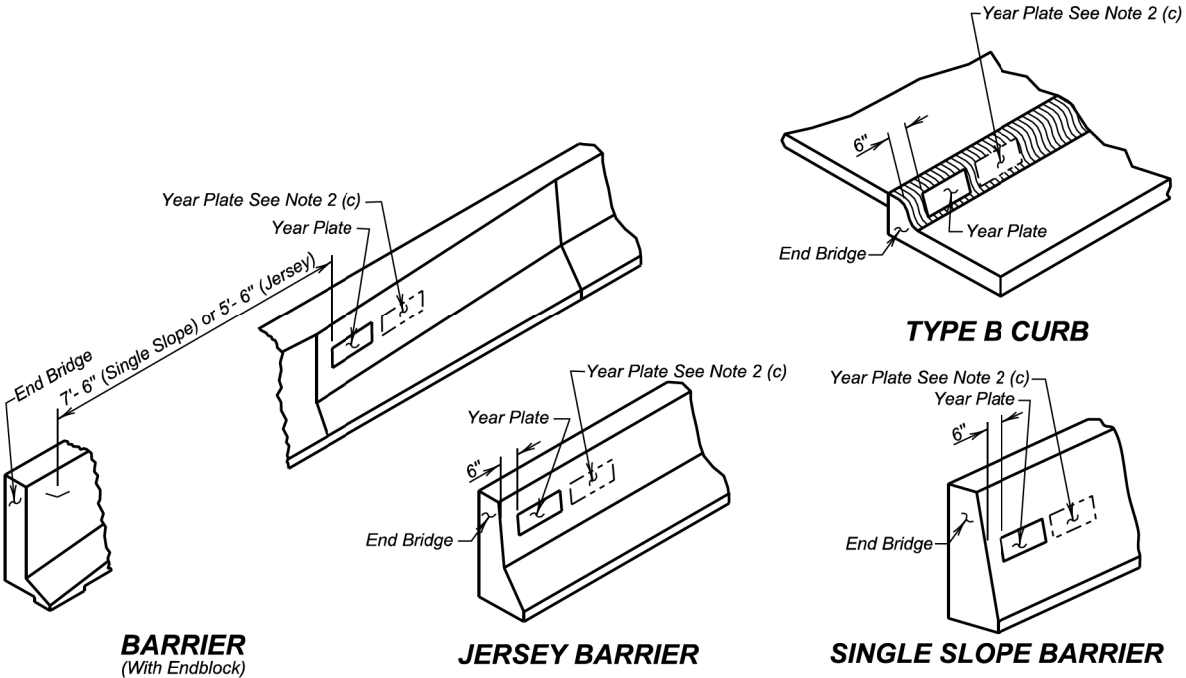
LAWRENCE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025



YEAR PLATE DETAILS

GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one - half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



TYPE B CURB

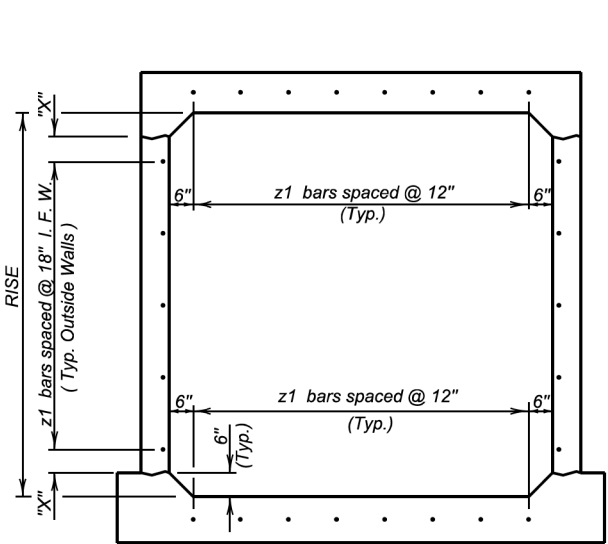
BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

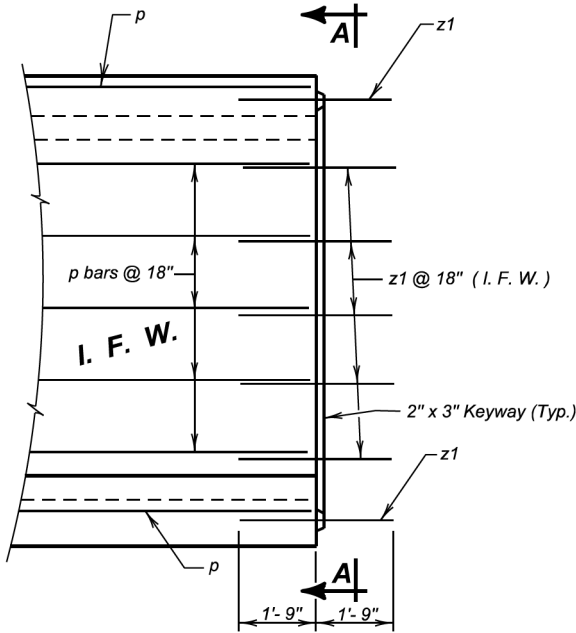
January 22, 2021

Published Date: 2026	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER
			460.02
			Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A

LEGEND FOR PLACING RE-STEEL
I. F. W. - Inside Face Wall

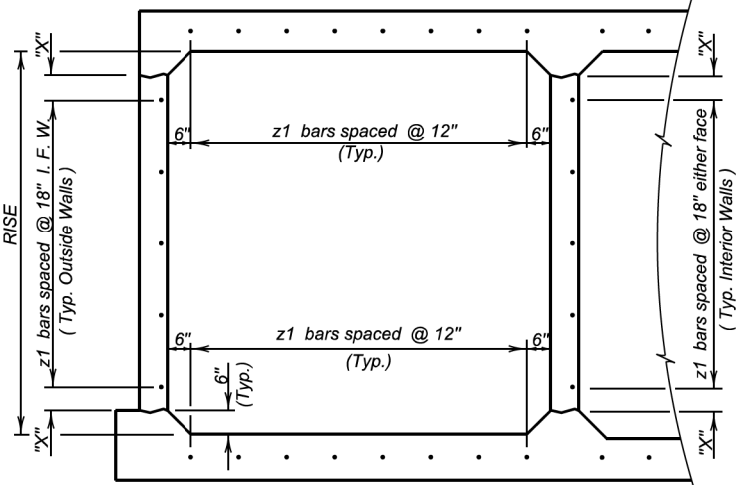


ELEVATION

RISE	"X"
3'-0"	3"
4'-0"	9"
5'-0"	6"
6'-0"	3"
7'-0"	9"
8'-0"	6"
9'-0"	3"
10'-0"	9"
11'-0"	6"
12'-0"	3"
13'-0"	9"
14'-0"	6"

GENERAL NOTES:

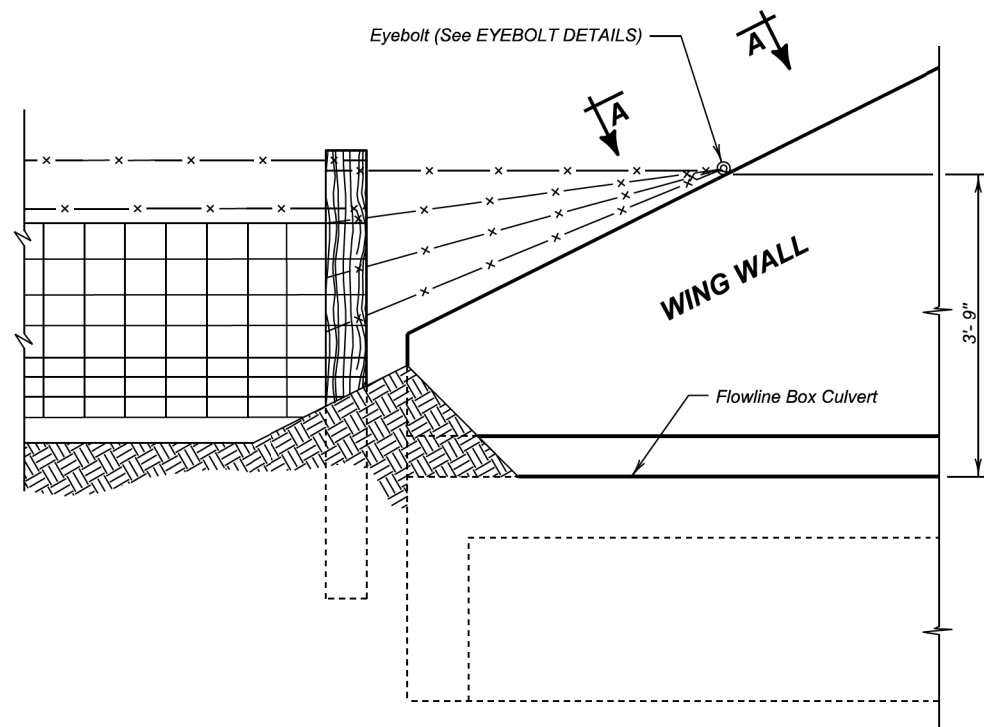
- z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
- Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.



TYPICAL MULTIPLE BARREL VIEW A - A

Published Date: 2026	S D D O T	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER
			460.10
			Sheet 1 of 1

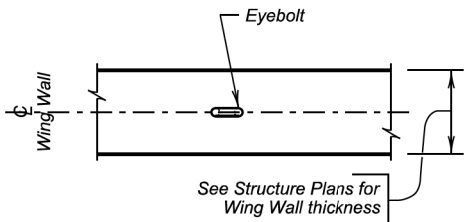
June 1, 2022



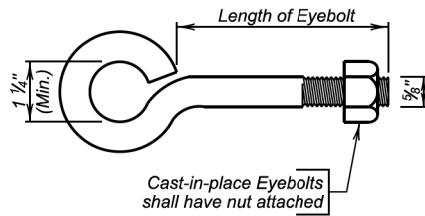
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

- 1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
- 2. Eyebolts shall be placed on all of the box culvert wing walls.
- 3. Eyebolts shall be 5/8 inch diameter and shall conform to ASTM A307.
- 4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
- 5. Cast-in-place eyebolts shall have a nut attached, be 4 1/2 inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the 5/8 inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
- 6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23, 2012

Published Date: 2026	S D D O T	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16
			Sheet 1 of 1